Plots - Edge angle analysis

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2021-02-04 16:57:32

# Goal of the script

This script plots the data from the edge angle analysis (archaeology) in order to visualizes the measurements.  
The plots will also visualize the differences between the three methods.

dir\_in <- "analysis/derived\_data/"  
dir\_out <- "analysis/plots"

Raw data must be located in ~/analysis/derived\_data/.  
Formatted data will be saved in ~/analysis/plots. The knit directory for this script is the project directory.

# Load packages

library(R.utils)  
library(ggplot2)

Warning: package 'ggplot2' was built under R version 4.0.3

library(tools)  
library(tidyverse)

Warning: package 'readr' was built under R version 4.0.3

Warning: package 'dplyr' was built under R version 4.0.3

Warning: package 'forcats' was built under R version 4.0.3

library(patchwork)

Warning: package 'patchwork' was built under R version 4.0.3

library(doBy)

Warning: package 'doBy' was built under R version 4.0.3

library(ggrepel)

Warning: package 'ggrepel' was built under R version 4.0.3

library(openxlsx)

Warning: package 'openxlsx' was built under R version 4.0.3

# Get name, path and information of the file

data\_file <- list.files(dir\_in, pattern = "\\.Rbin$", full.names = TRUE)  
md5\_in <- md5sum(data\_file)  
info\_in <- data.frame(file = basename(names(md5\_in)), checksum = md5\_in, row.names = NULL)

The checksum (MD5 hashes) of the imported file is:

file checksum  
1 EdgeAngle.Rbin c0fbf0d522d77a70c3a828b8ba7880fc

# Load data into R object

imp\_data <- loadObject(data\_file)  
str(imp\_data)

'data.frame': 58516 obs. of 11 variables:  
 $ Site : chr "Balve" "Balve" "Balve" "Balve" ...  
 $ ID : chr "MU-022" "MU-022" "MU-022" "MU-022" ...  
 $ Tool\_type : chr "KM\_dex" "KM\_dex" "KM\_dex" "KM\_dex" ...  
 $ Section : num 1 1 1 1 1 1 1 1 1 1 ...  
 $ Edge : chr "E1" "E1" "E1" "E1" ...  
 $ Angle\_number : int 1 2 3 4 5 6 7 8 9 10 ...  
 $ Distance\_origin: num 1 2 3 4 5 6 7 8 9 10 ...  
 $ Segment : num 2 2 2 2 2 2 2 2 2 2 ...  
 $ Three\_point : num 158.6 137.6 124 105.4 89.5 ...  
 $ Two\_lines : num 137.9 106.4 71.6 41.4 35.9 ...  
 $ Best\_fit : num 138.8 107.7 70.5 42.2 30.8 ...

The imported file is: “~/analysis/derived\_data/EdgeAngle.Rbin”

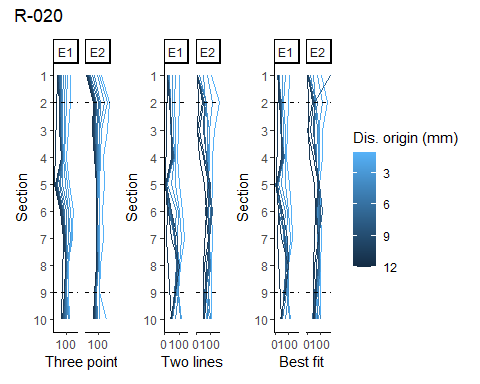
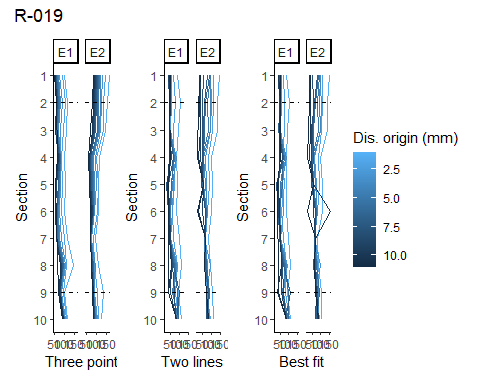
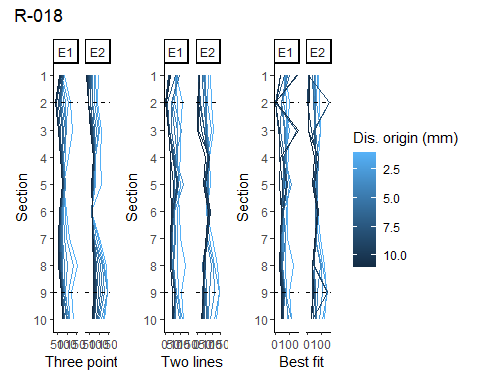
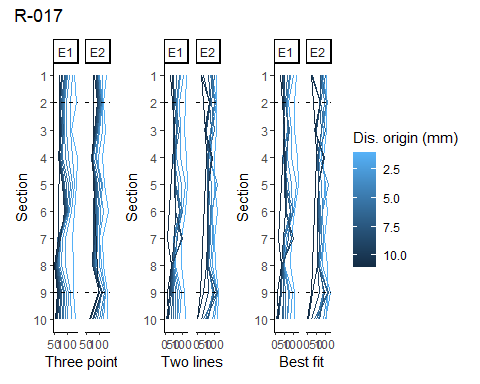
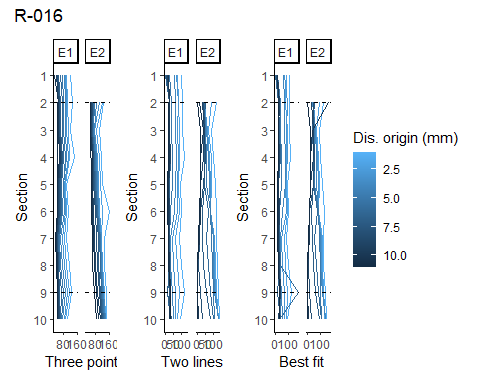
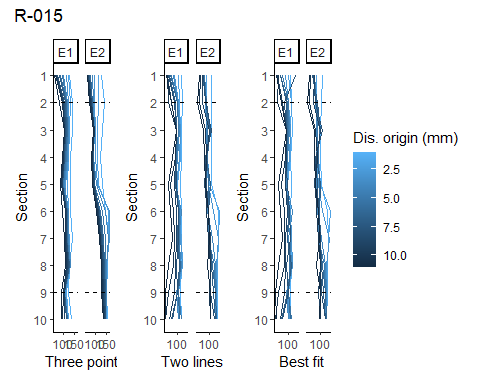
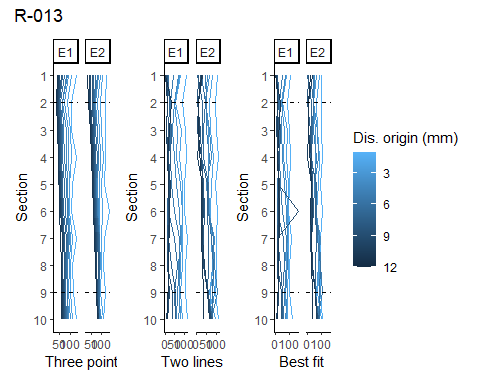
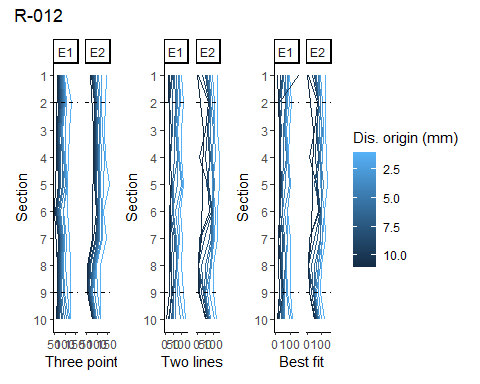
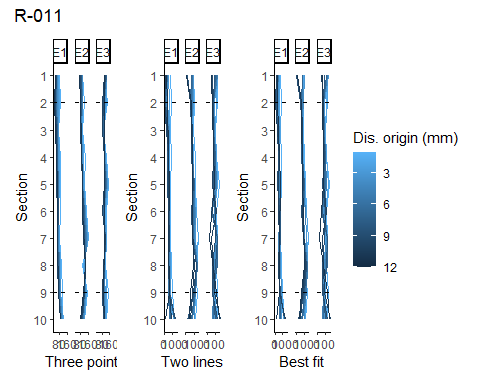
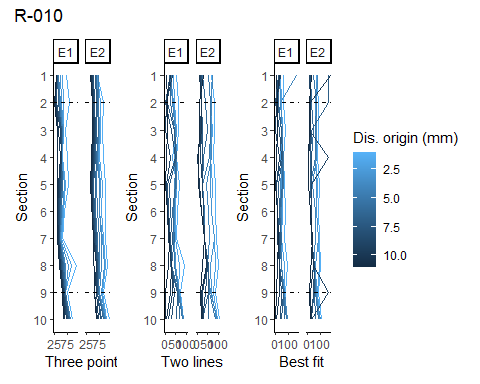
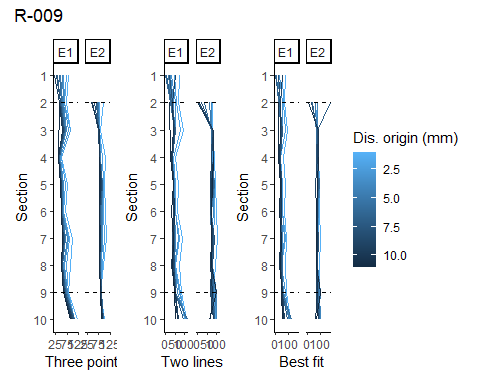
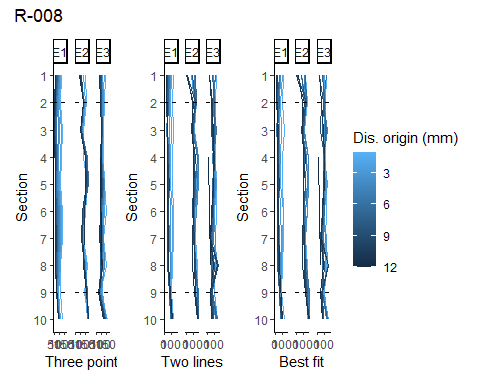
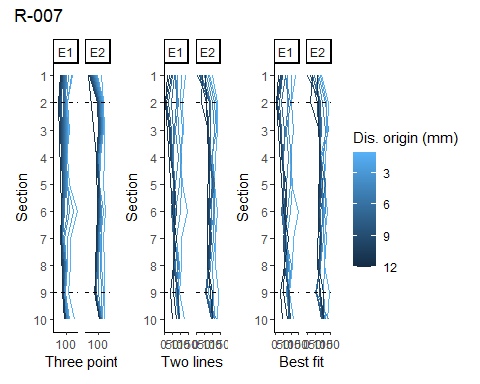
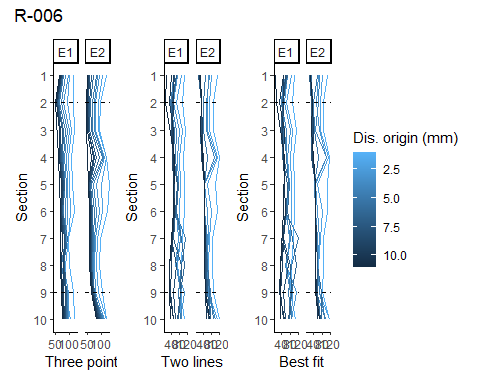
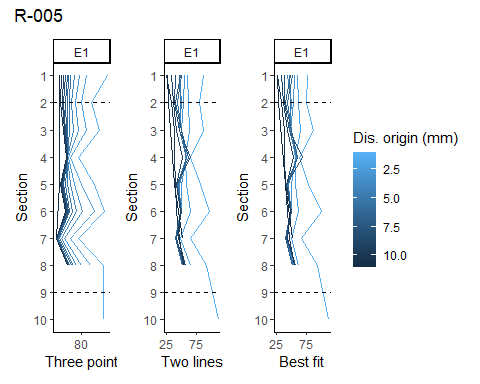
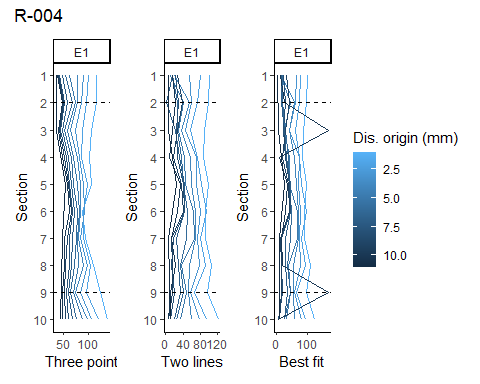
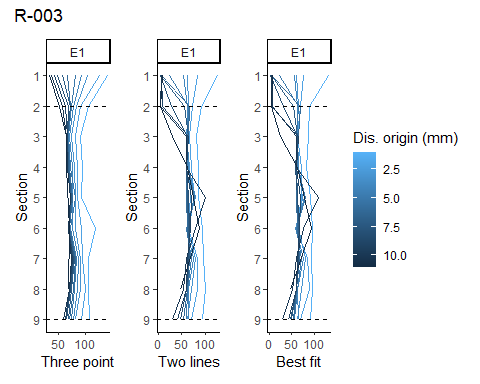
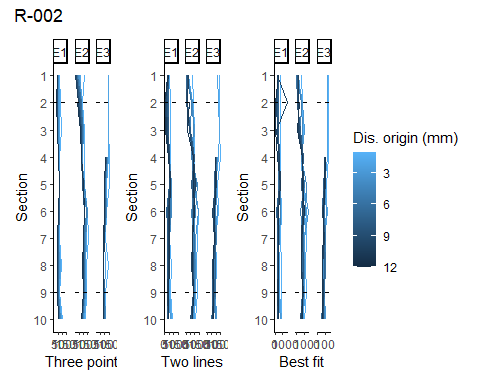
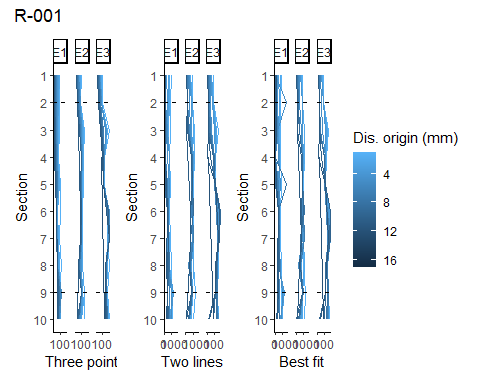
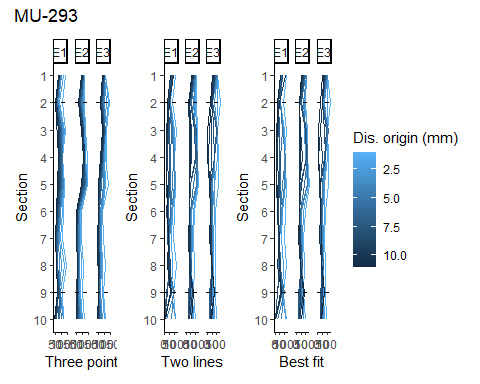
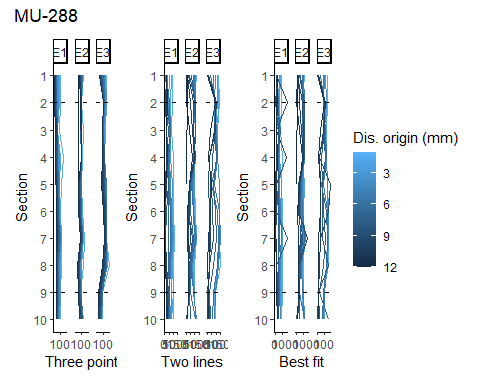
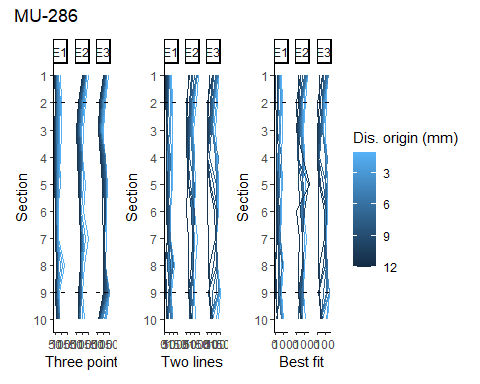
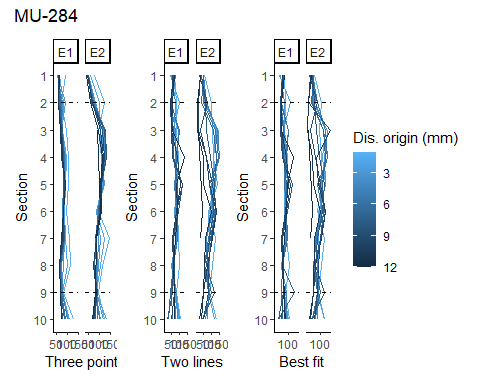
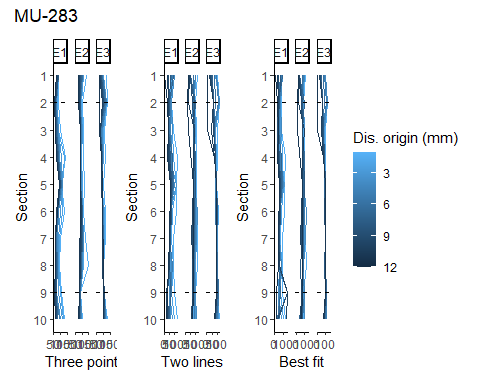
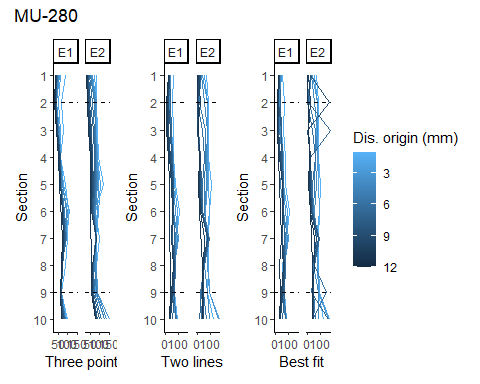
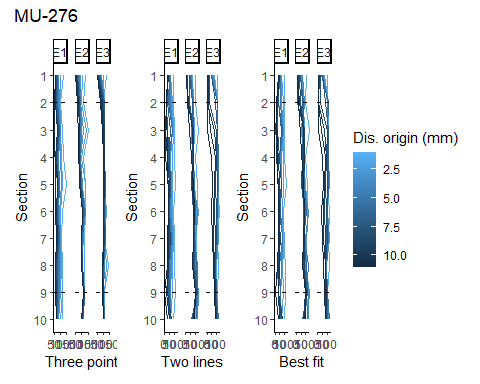
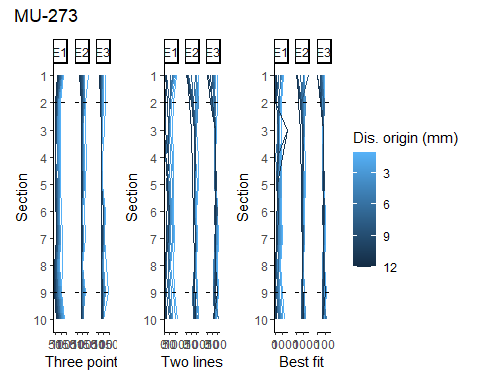
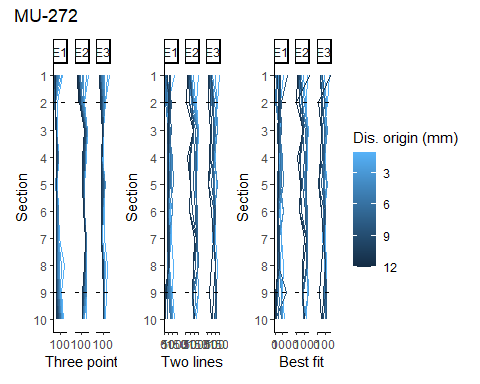
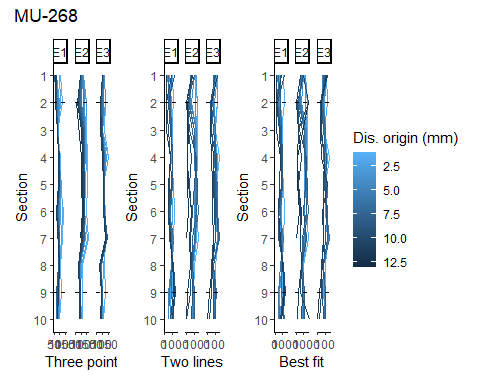
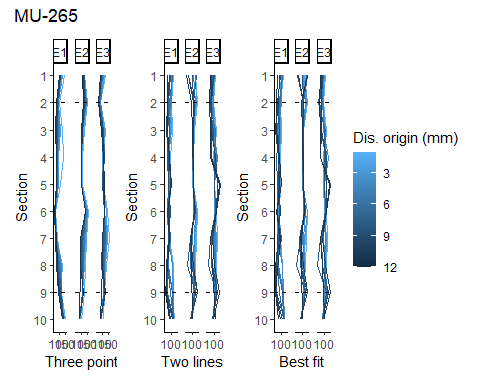
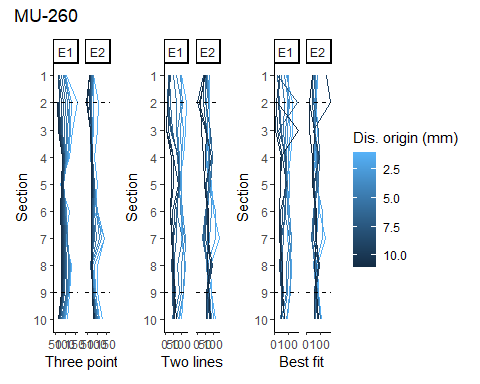
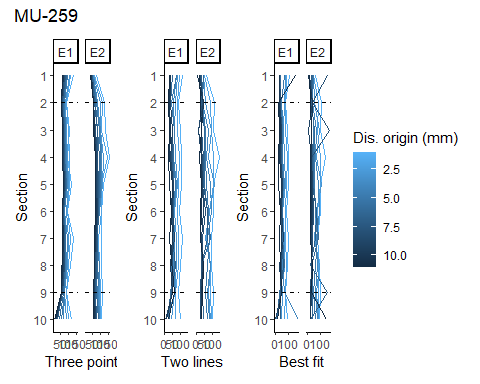
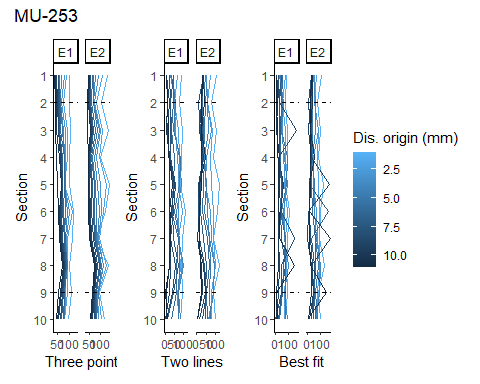
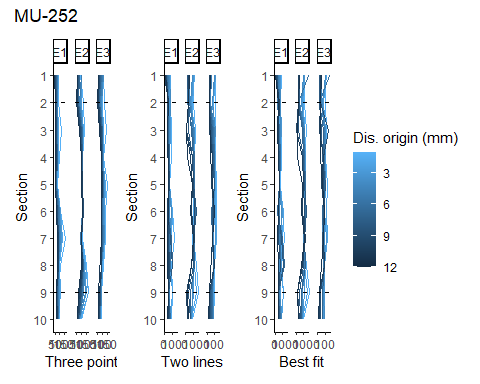
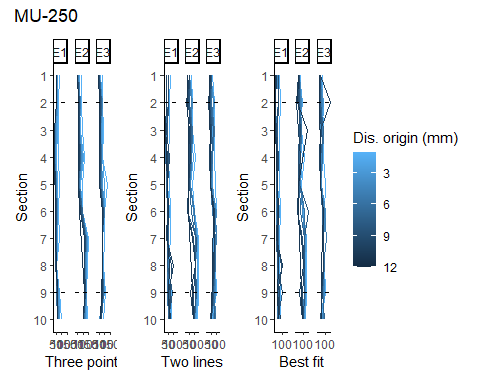
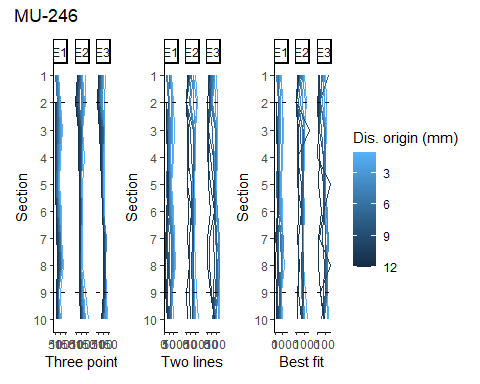
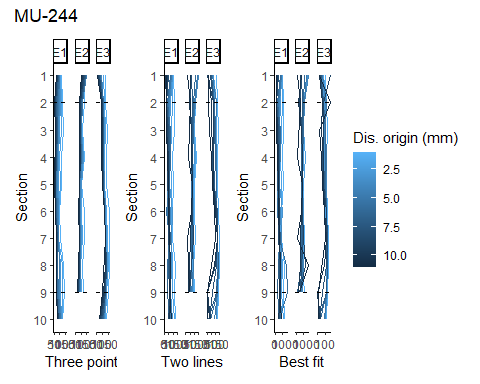
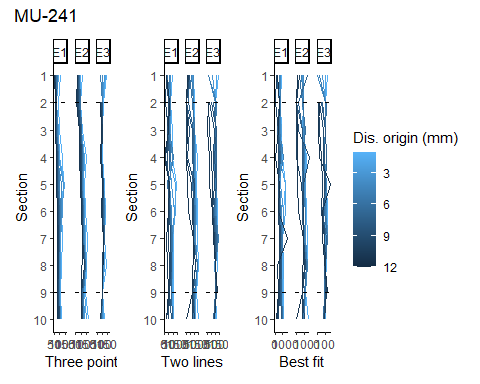
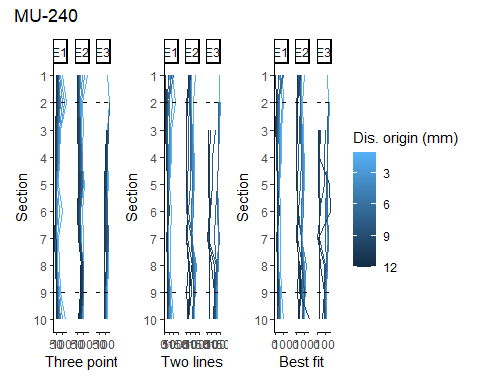
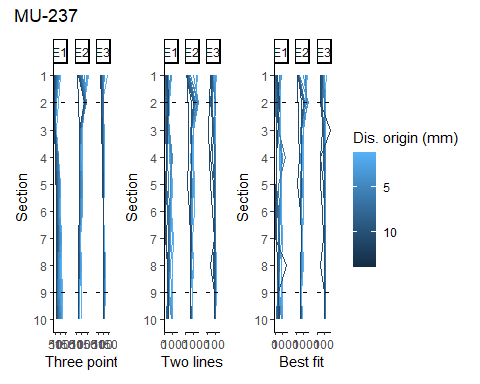
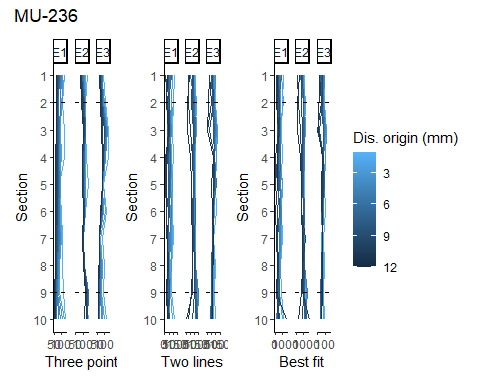
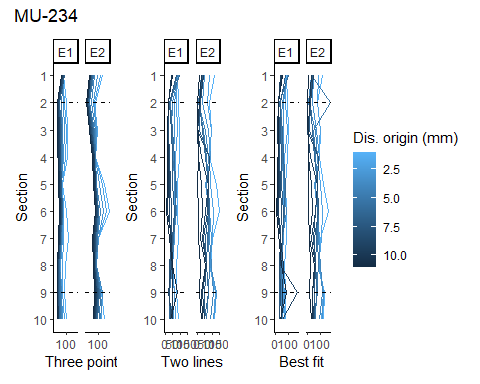
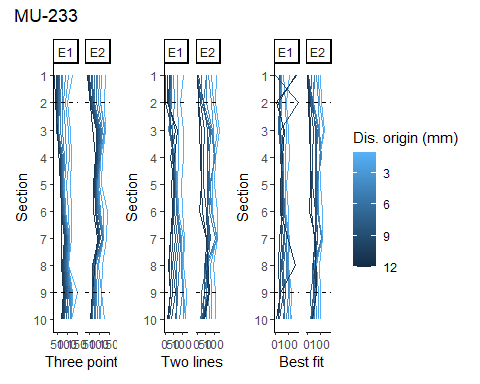
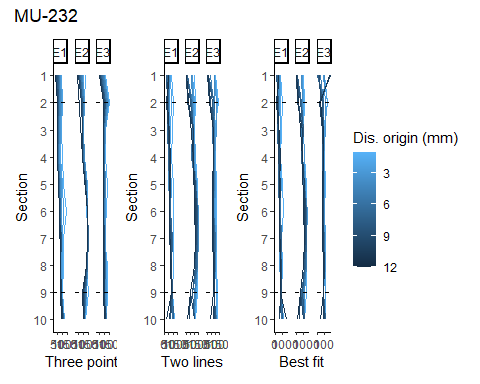
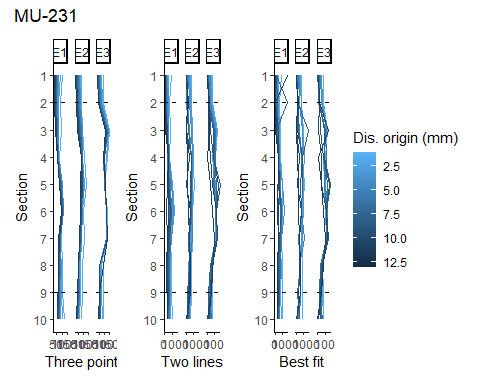
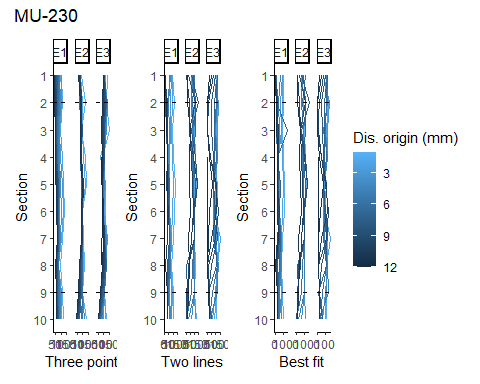
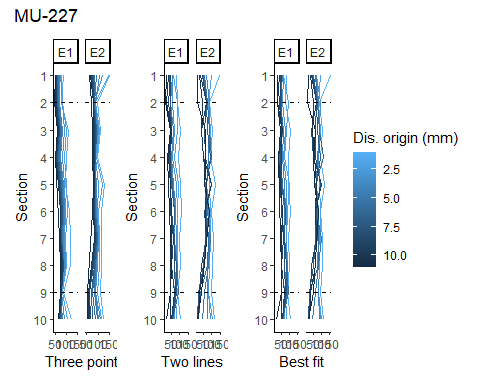
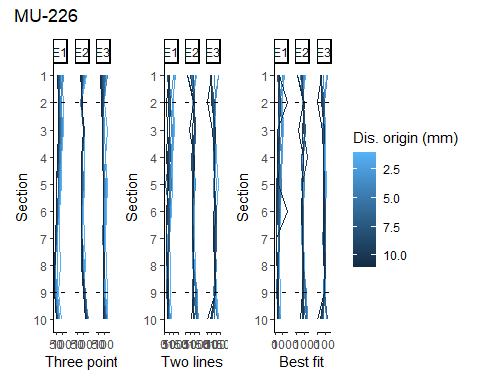
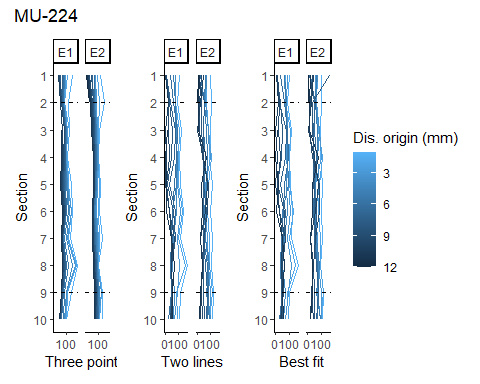
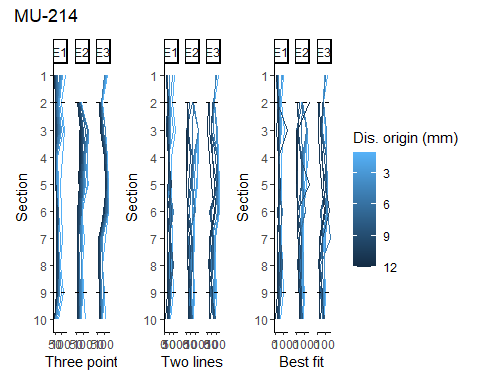
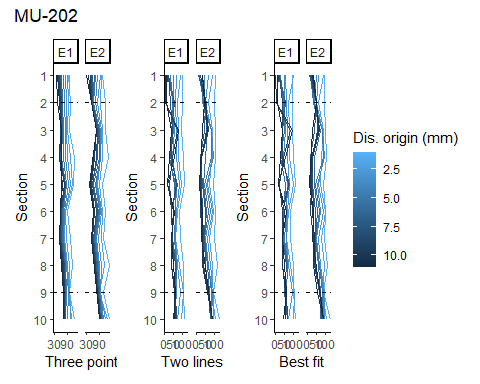
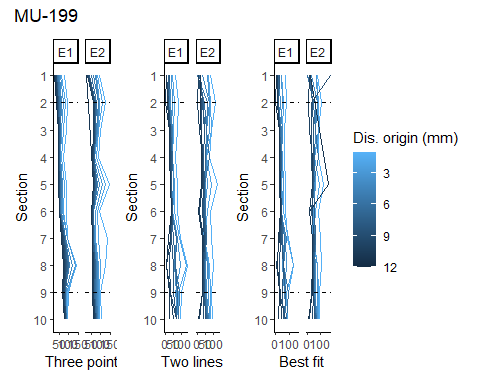
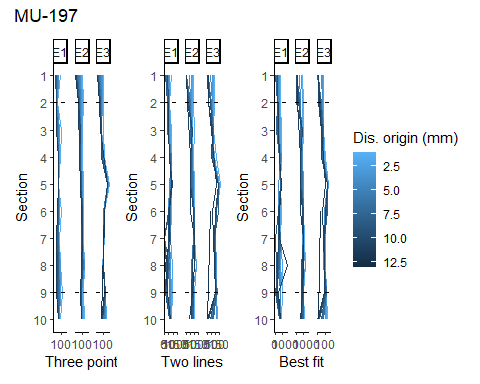
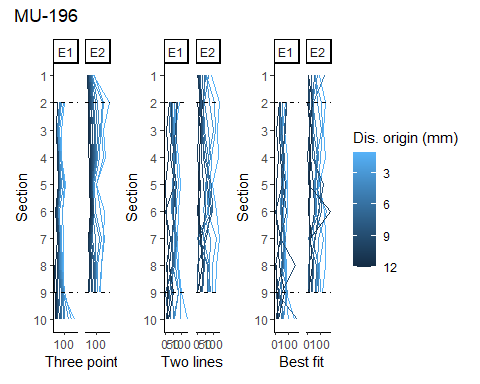
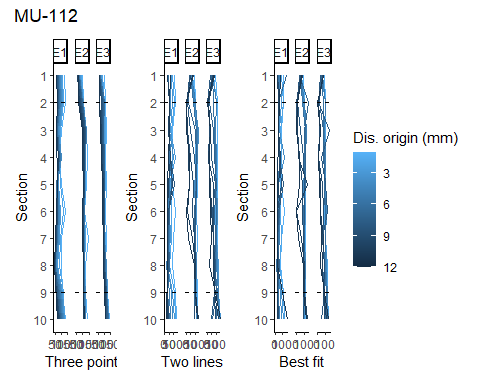
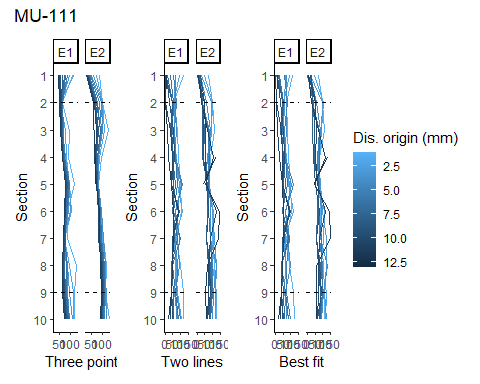
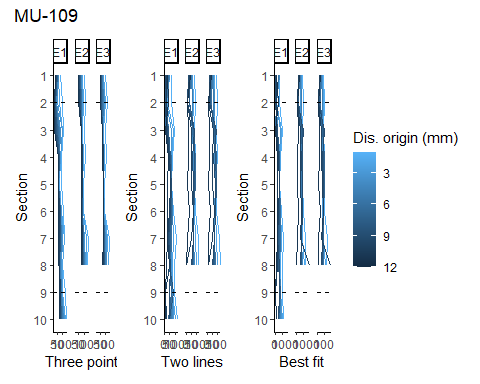
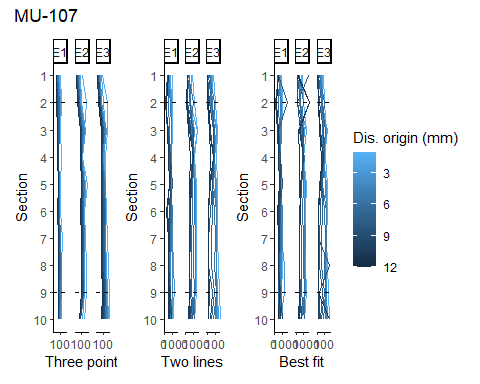
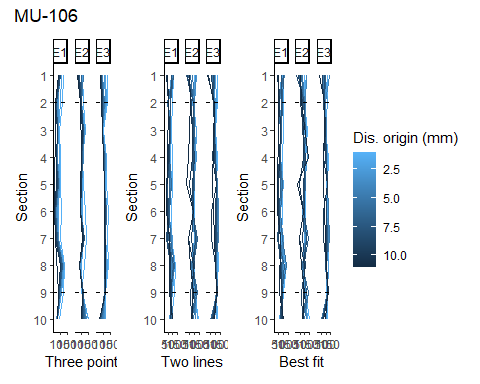
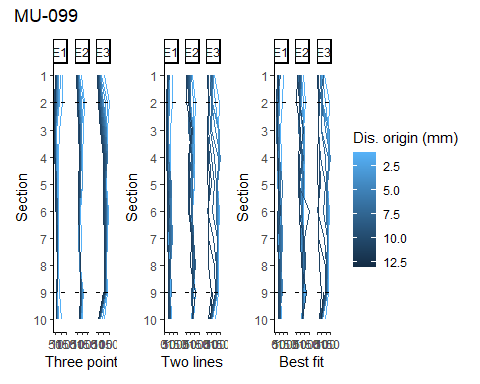
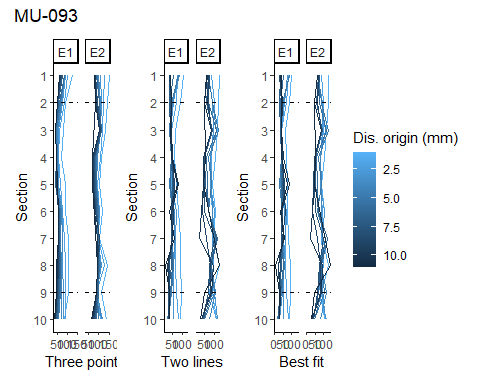
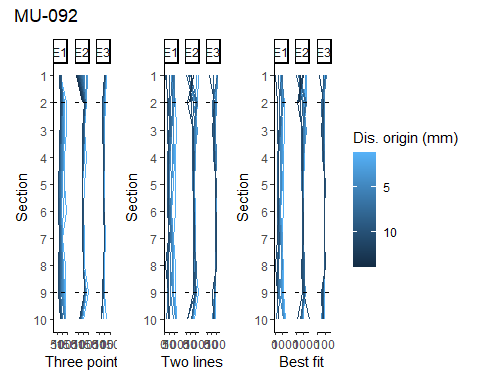
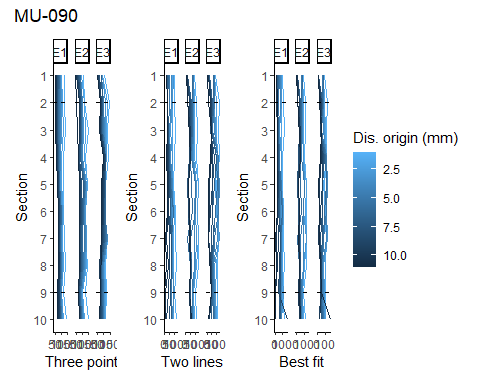
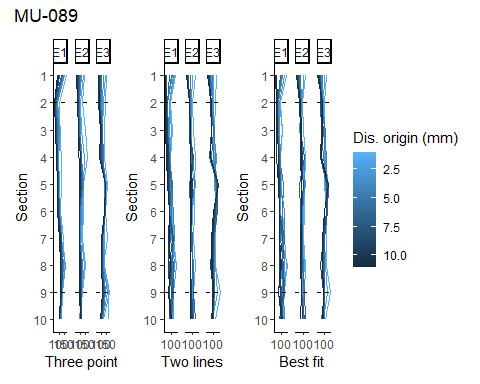
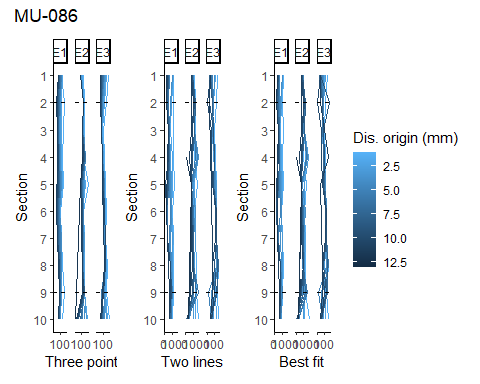
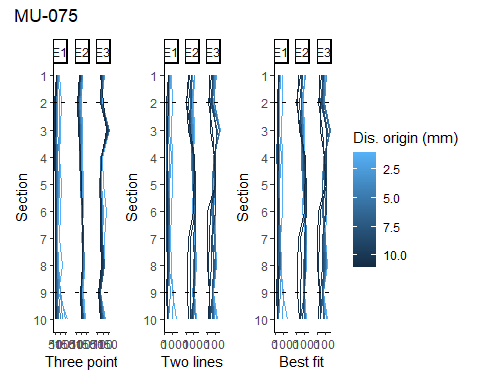
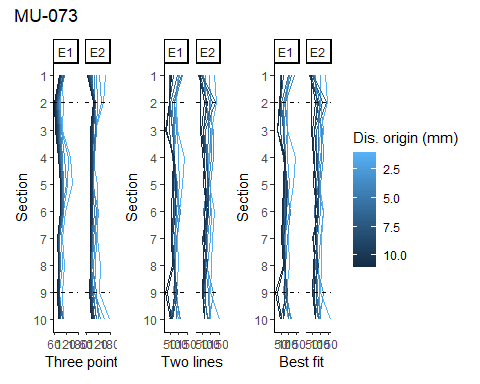
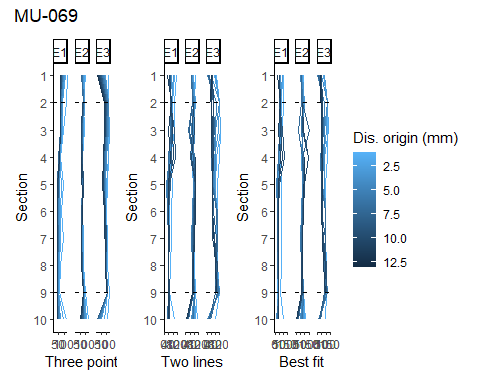
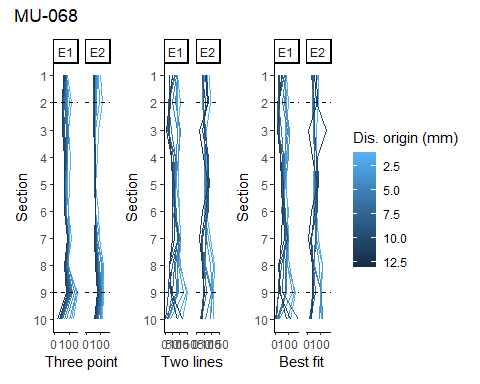
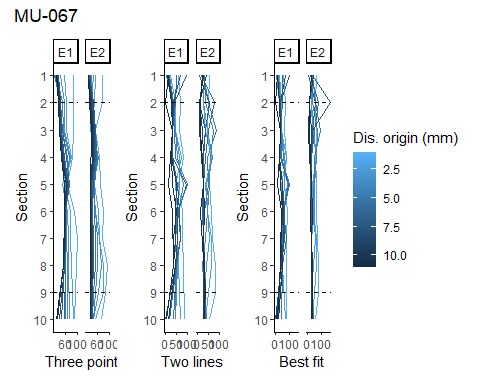
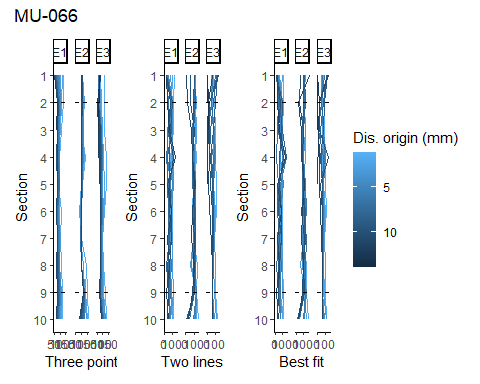
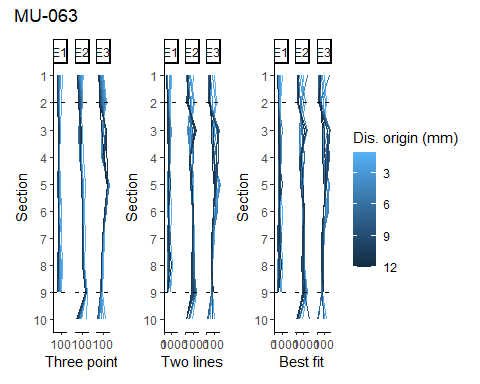
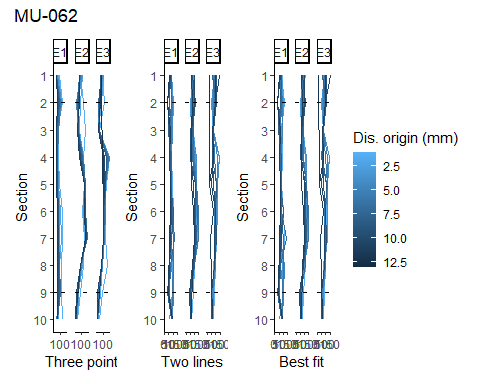
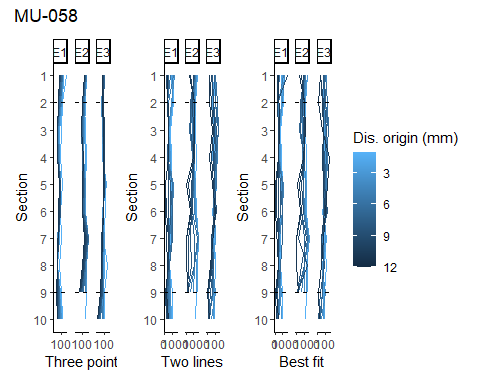
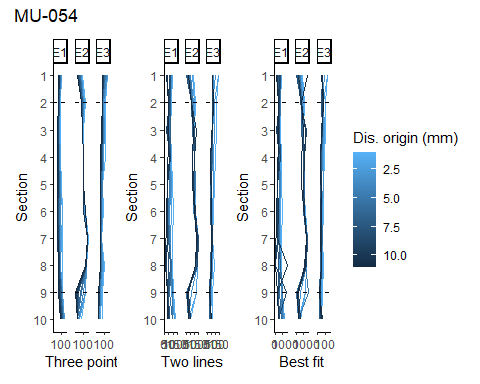
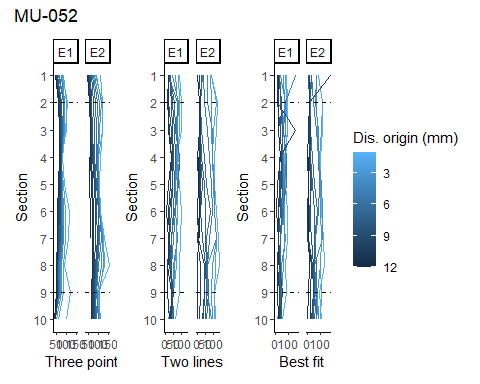
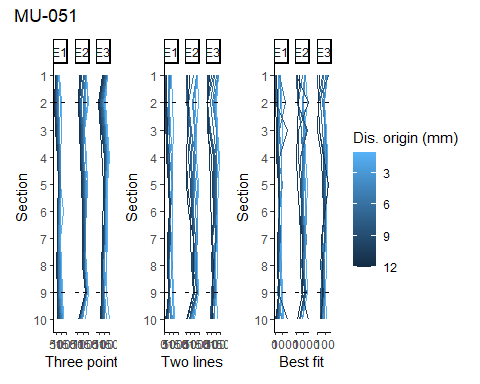
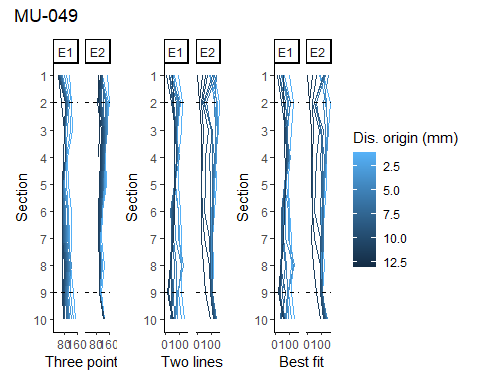
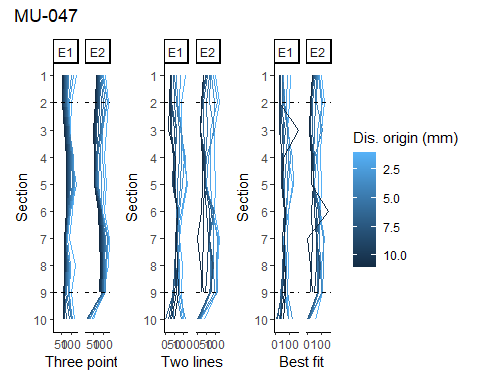
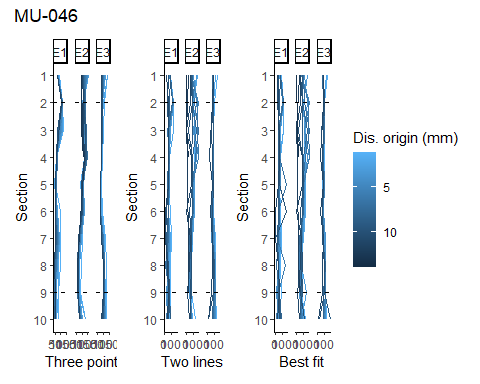
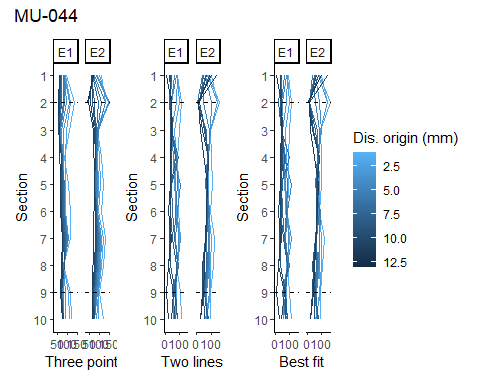
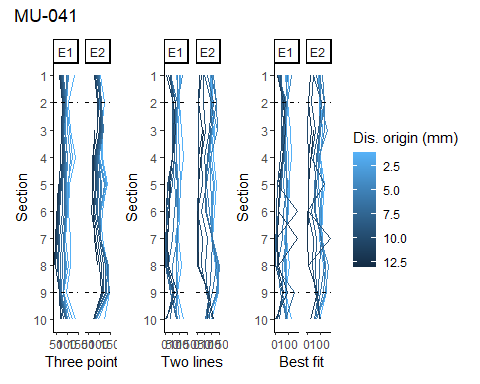
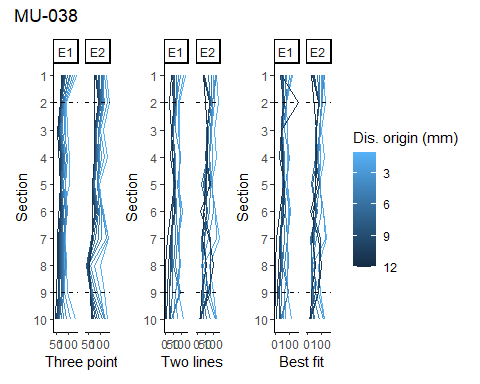
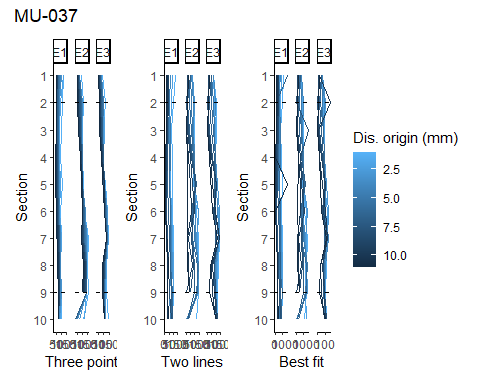
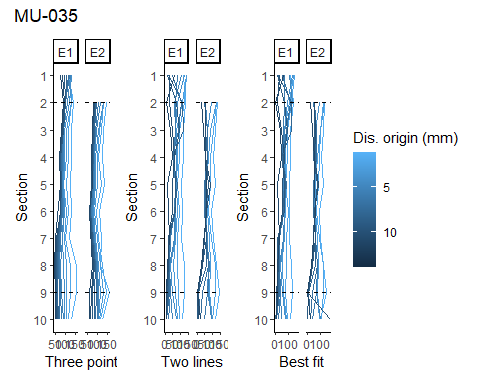
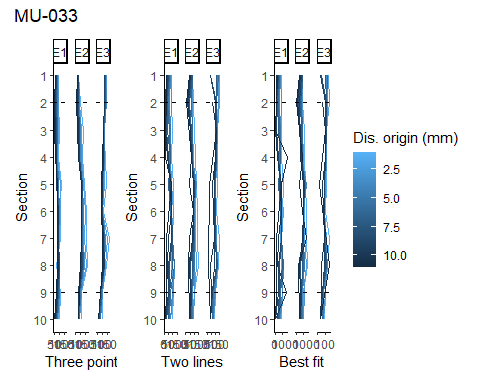
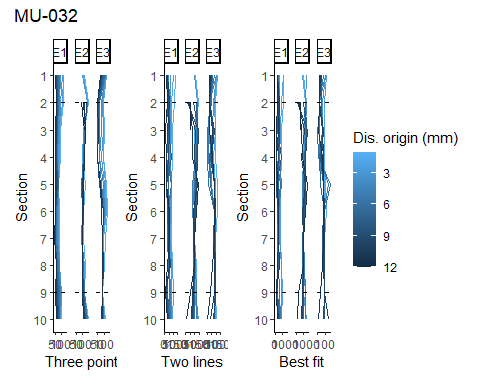
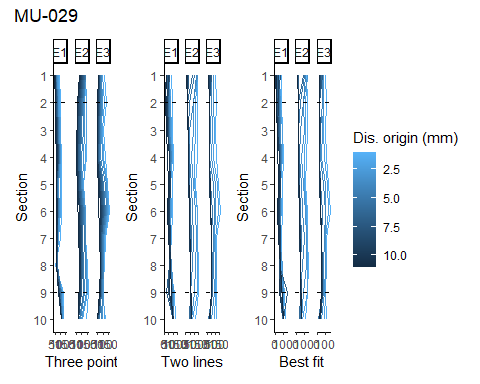
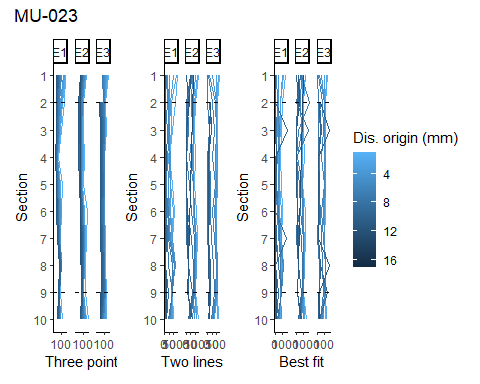
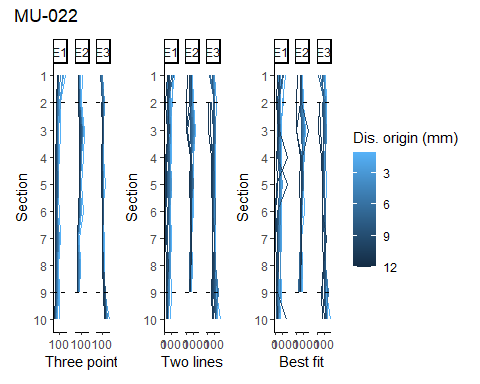
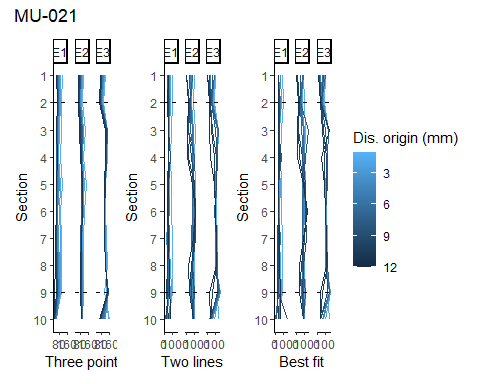
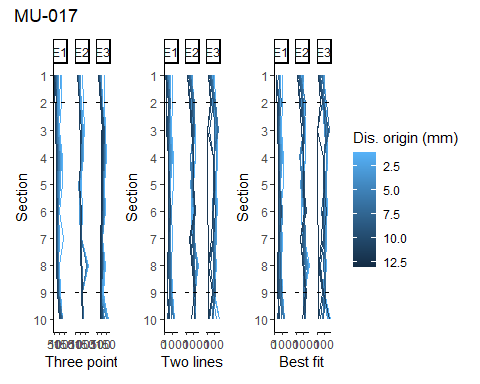
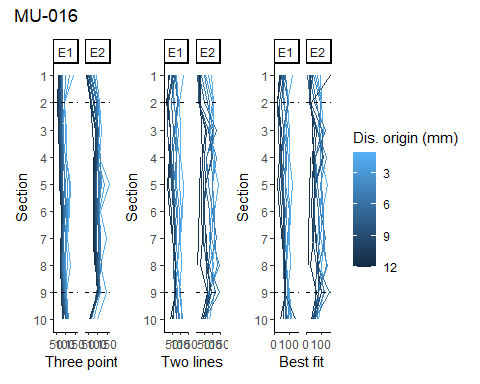
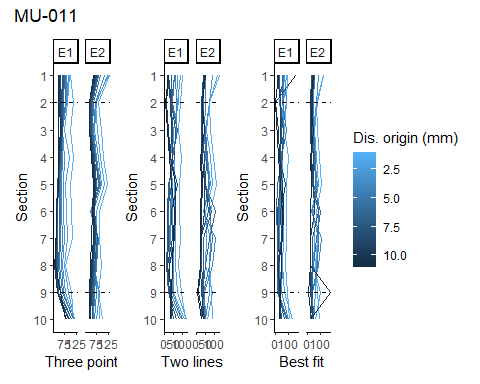
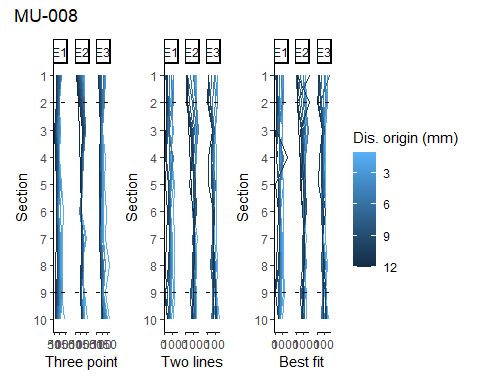
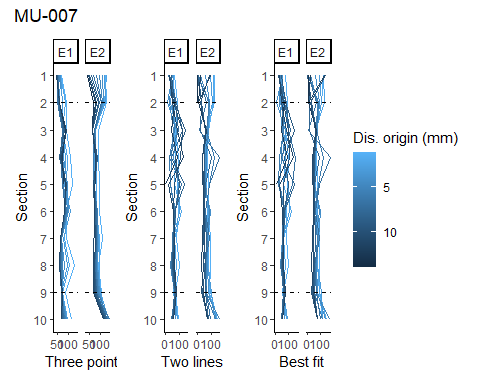
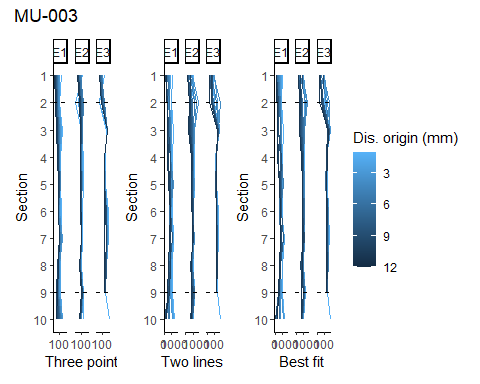
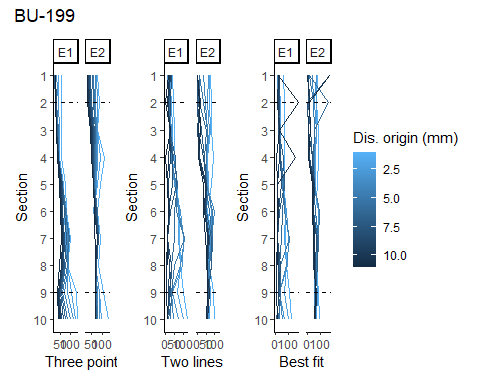
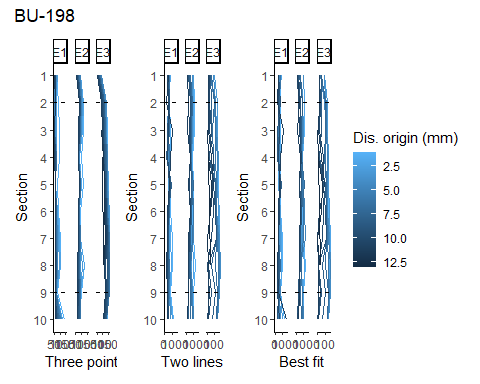
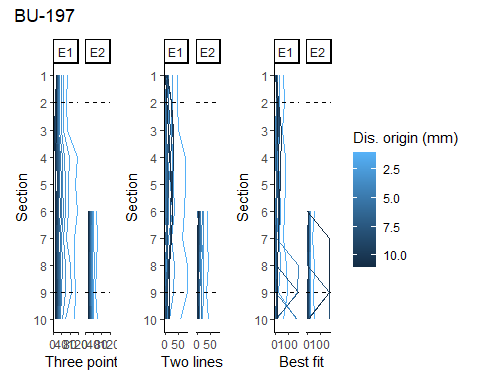
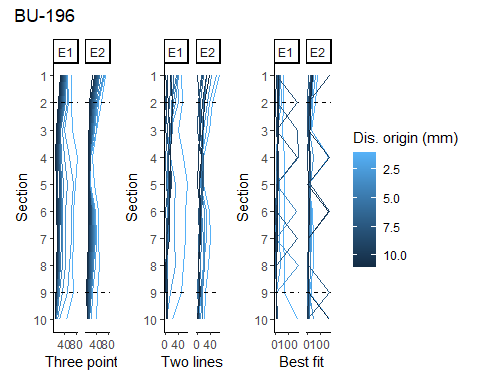
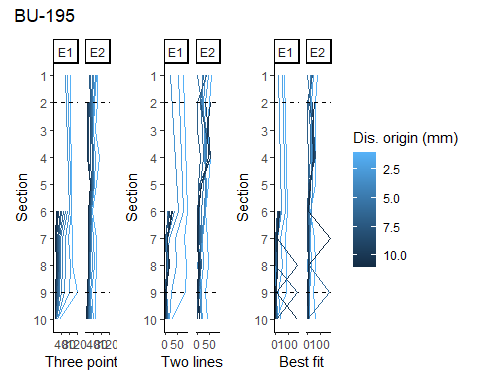
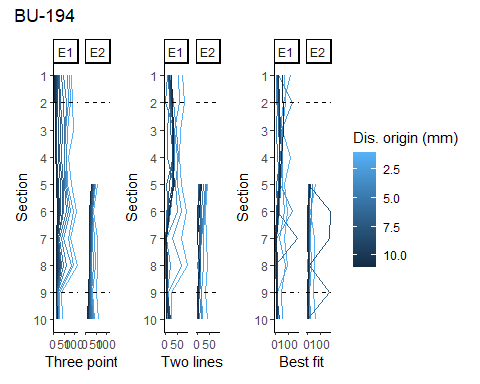
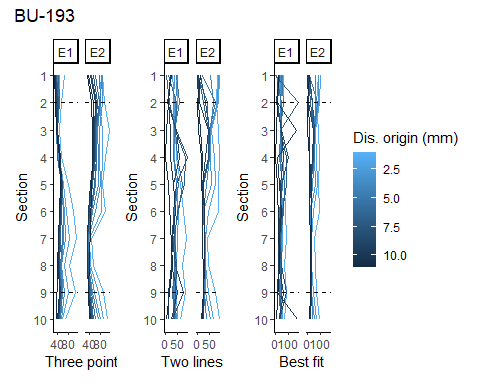
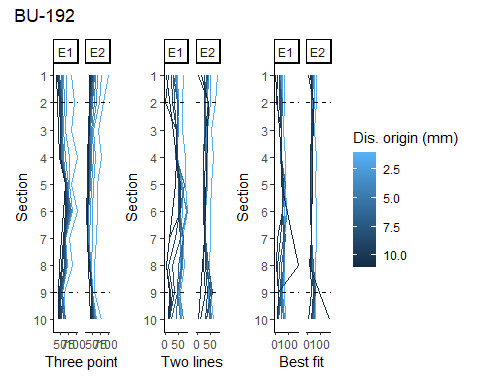
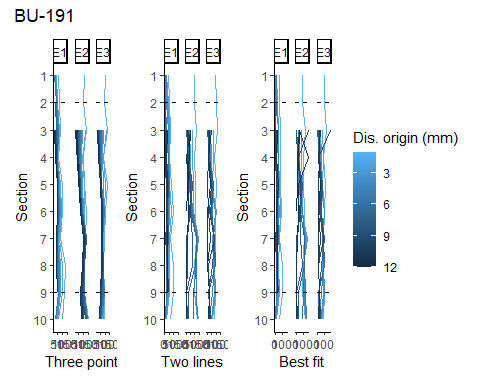
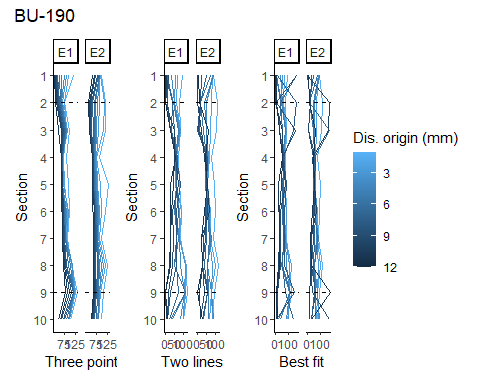
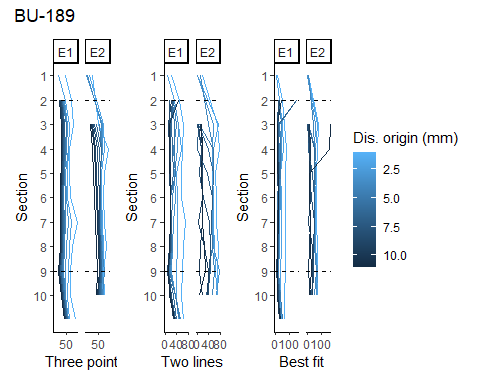
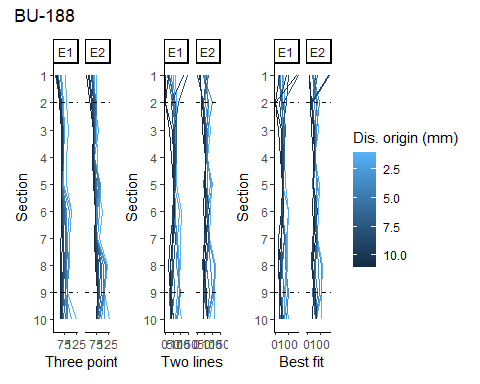
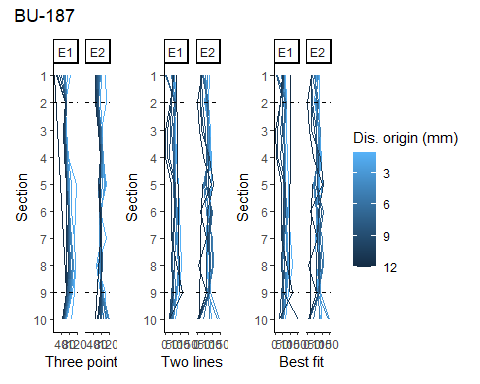
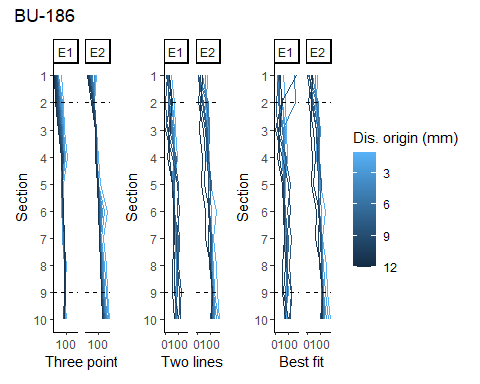
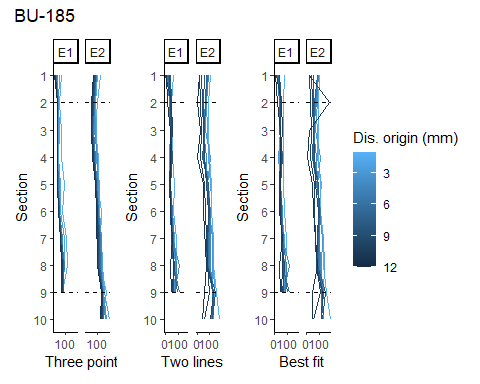
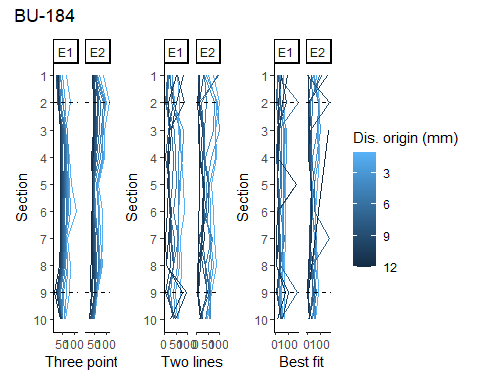
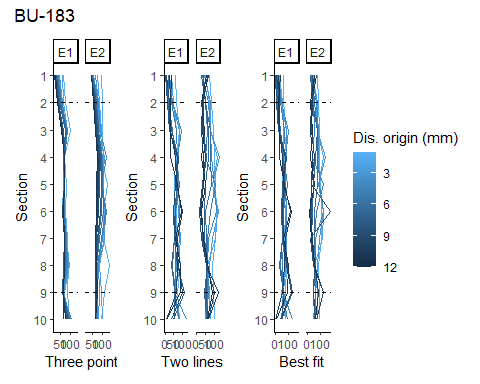
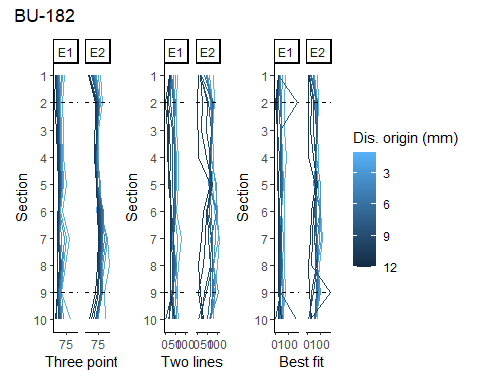
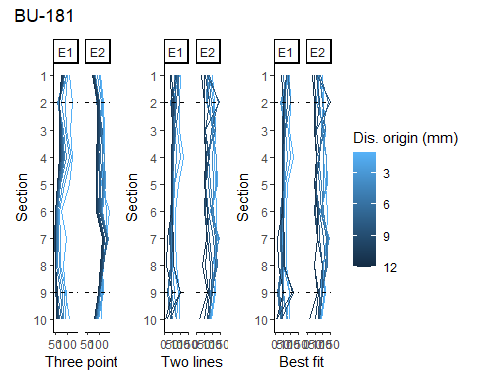
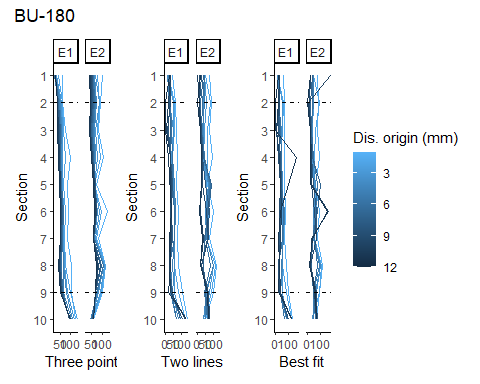
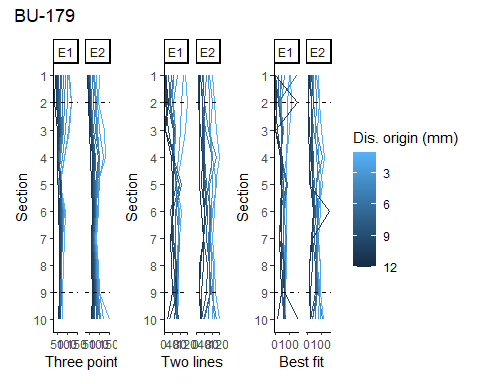
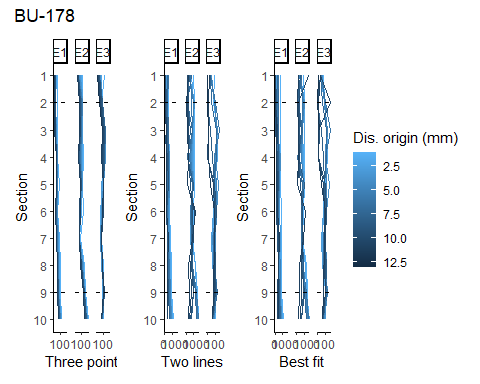
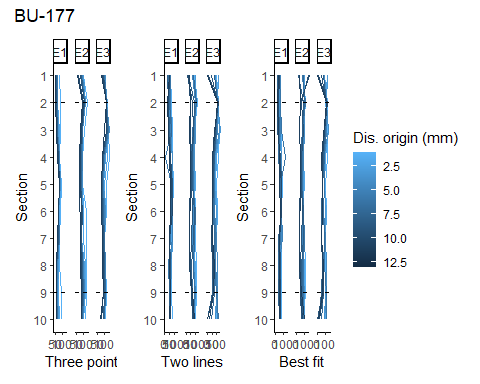
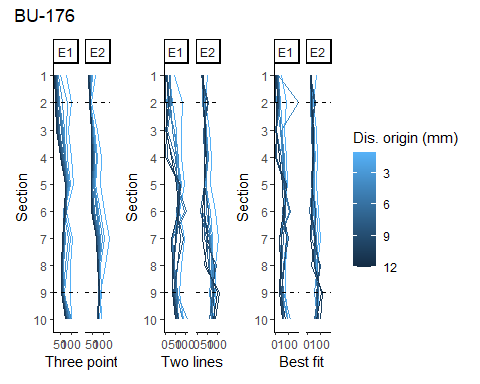
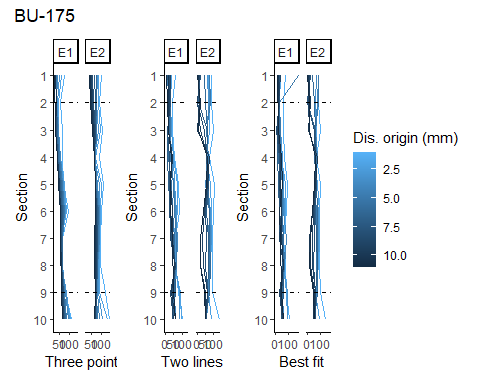
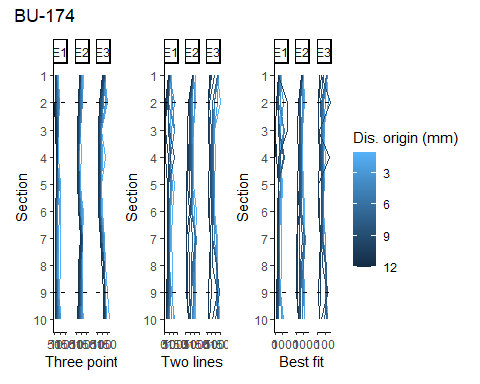
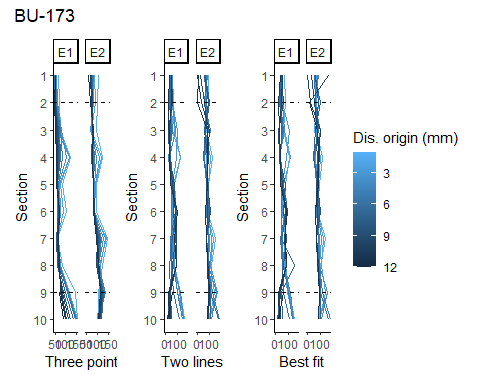
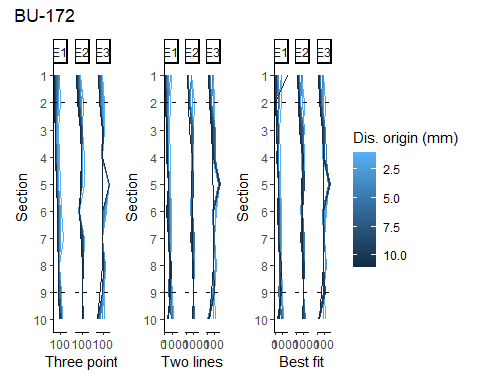
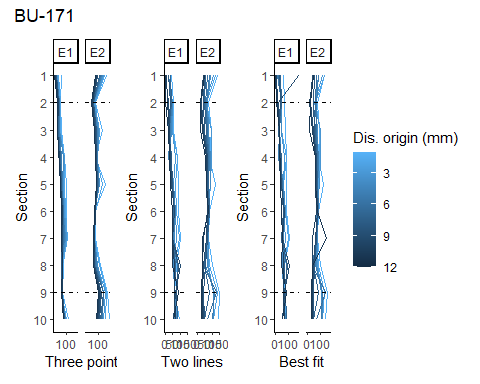
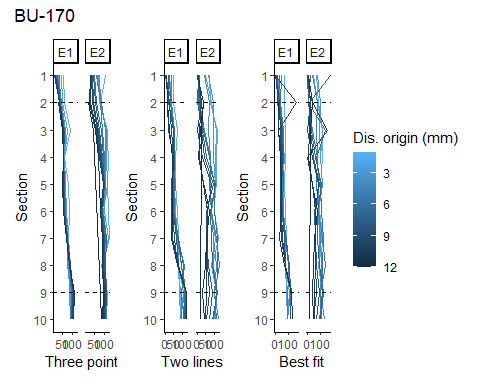
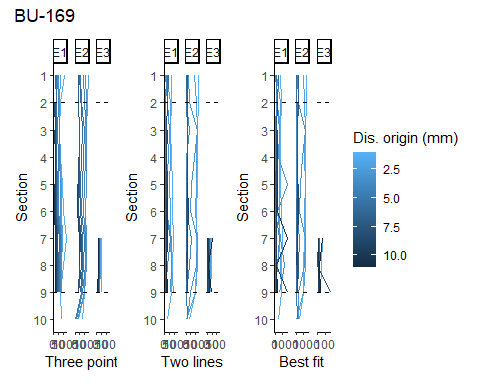
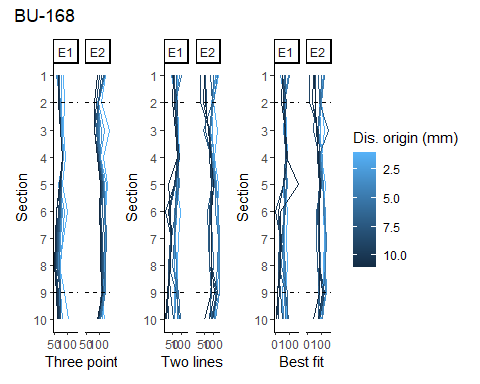
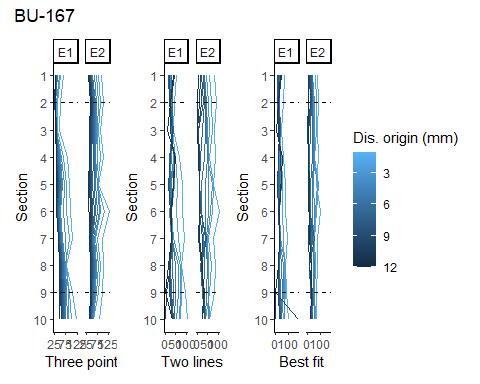
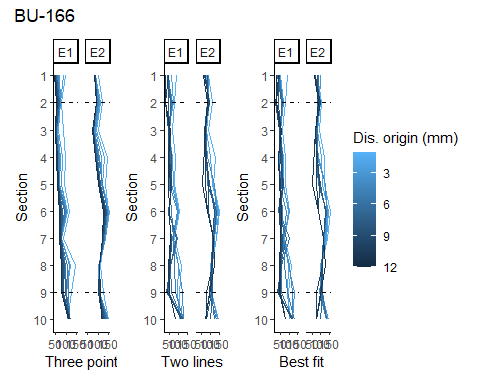
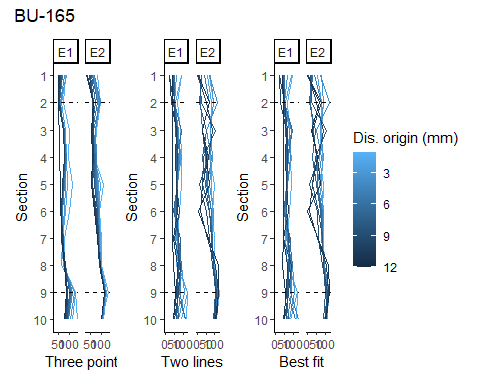
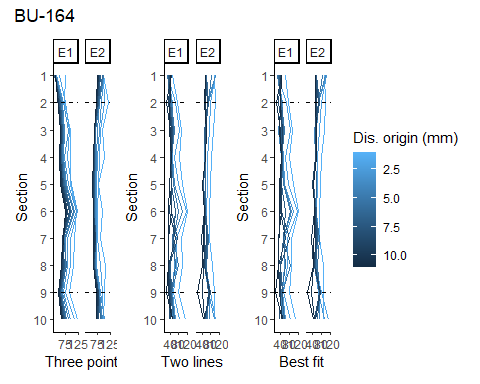
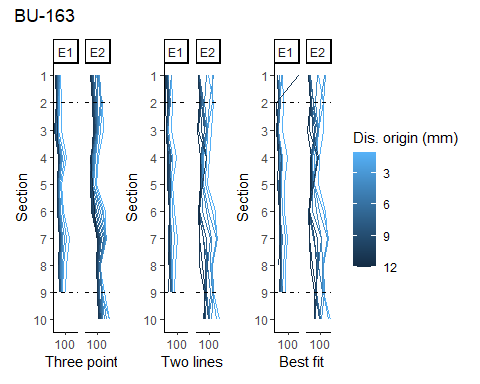
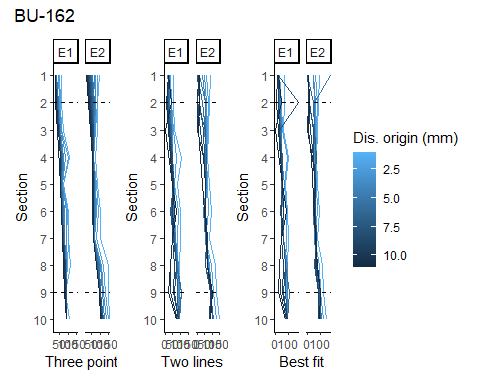
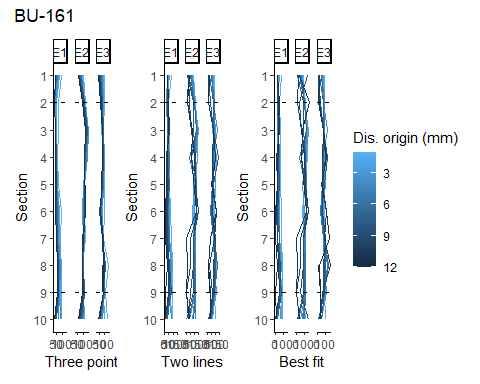
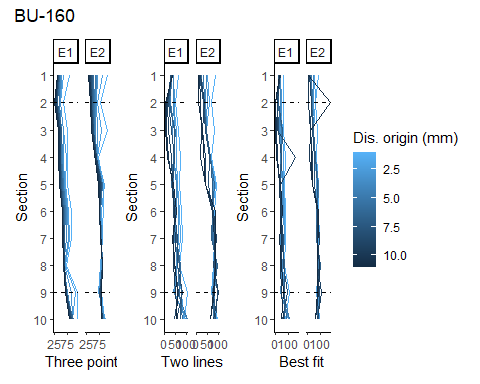
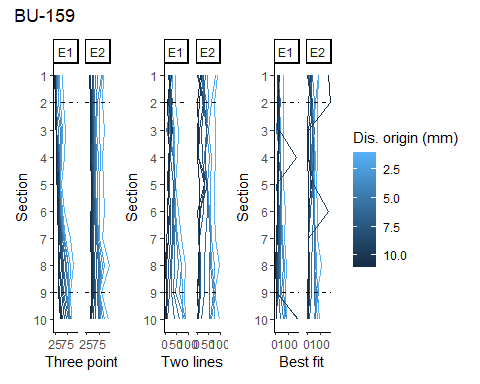
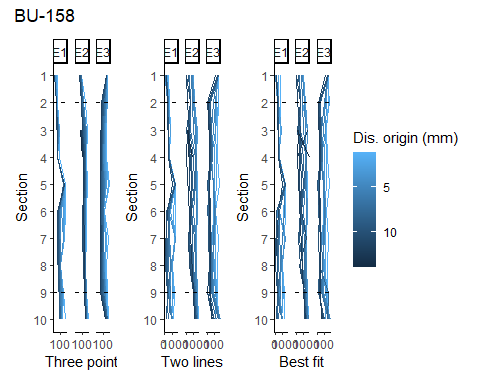
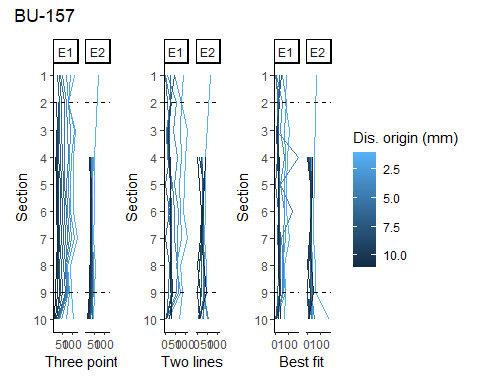
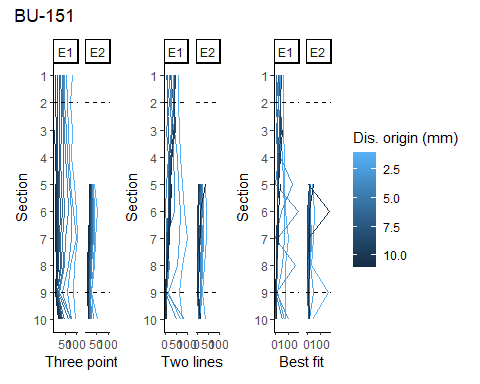
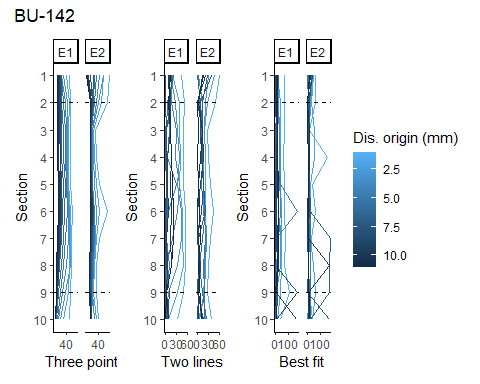
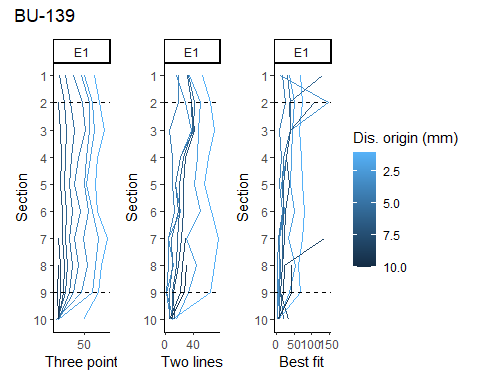
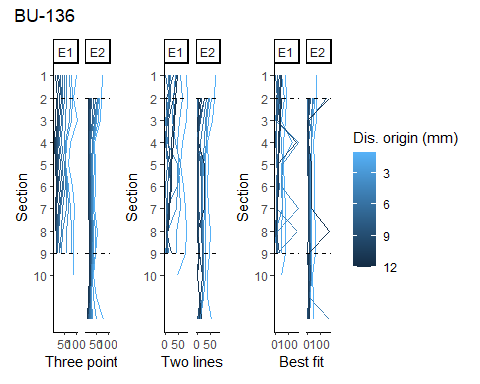
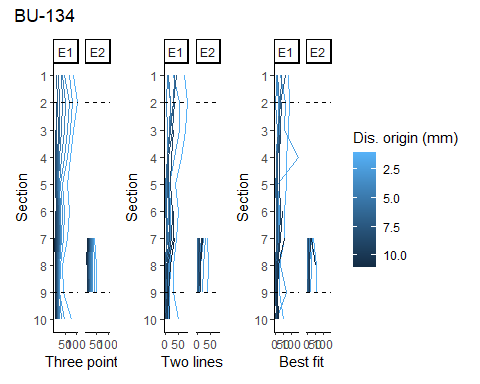
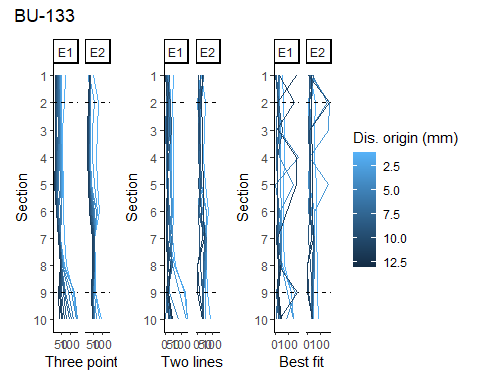
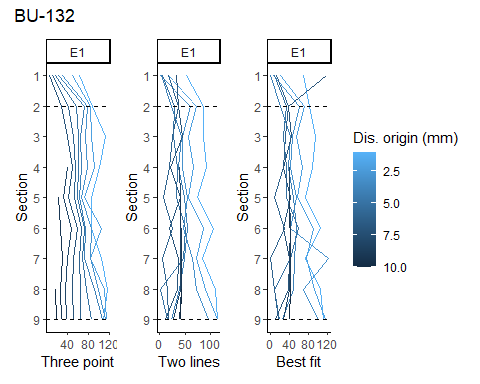
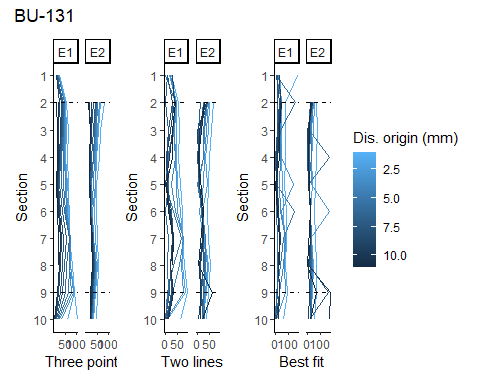
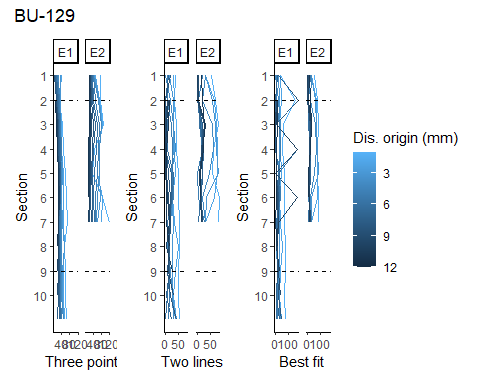
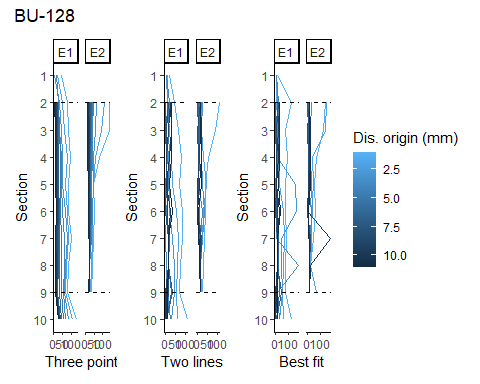
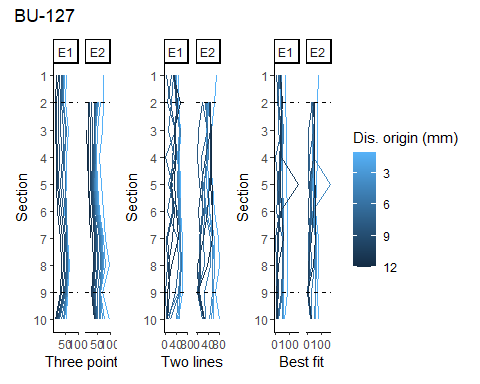
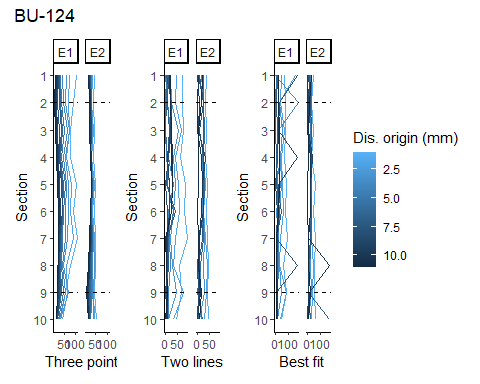
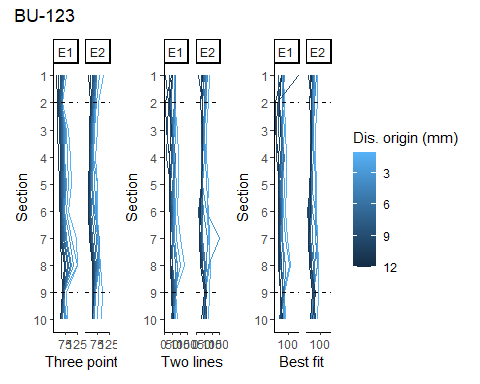
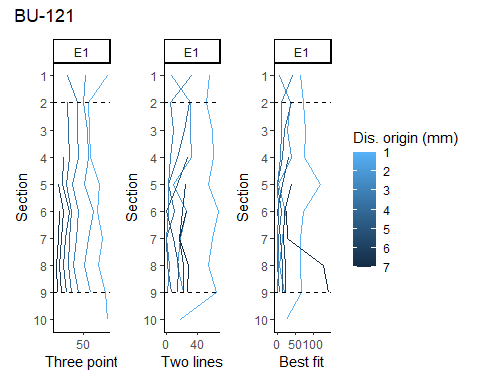
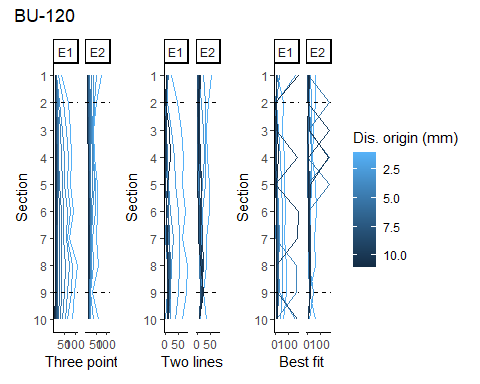
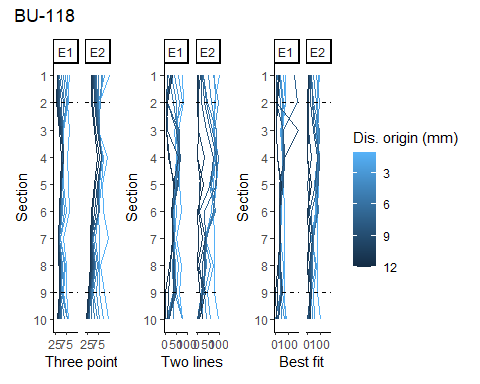
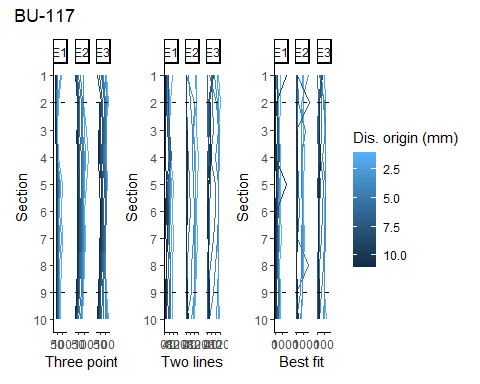
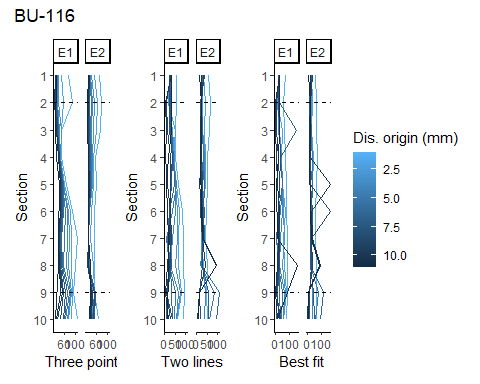
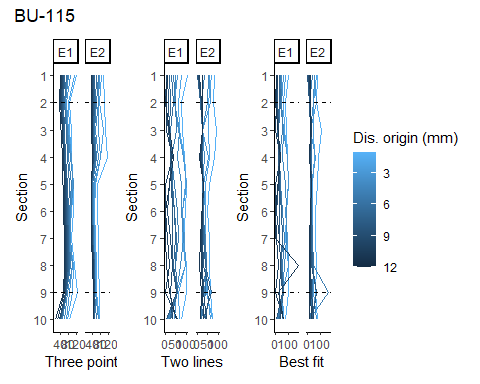
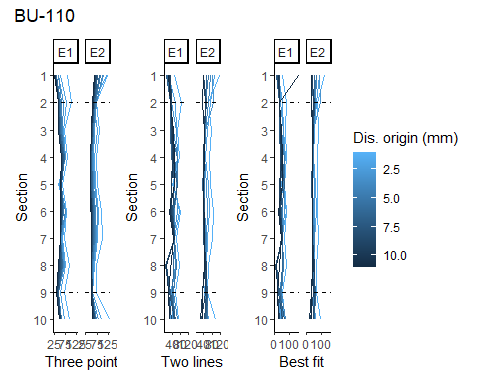
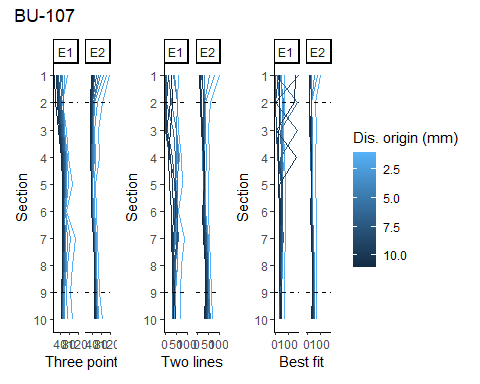
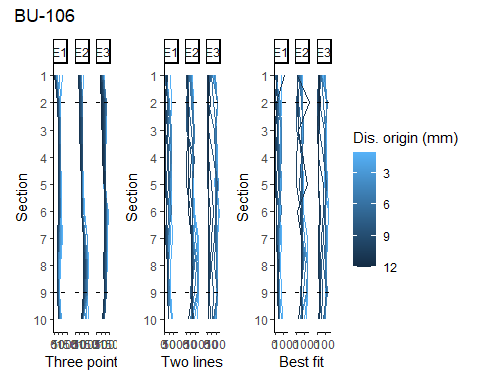
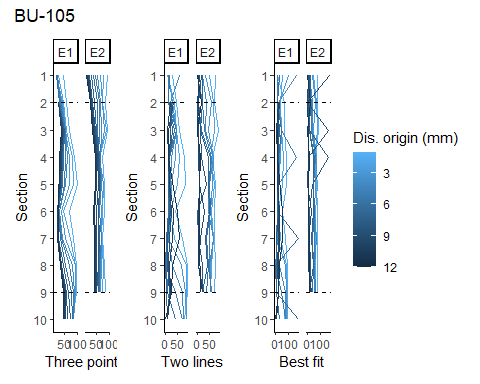
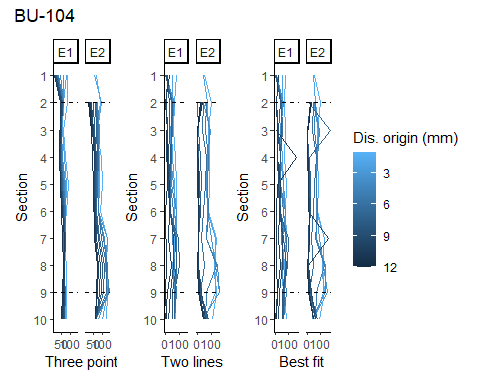
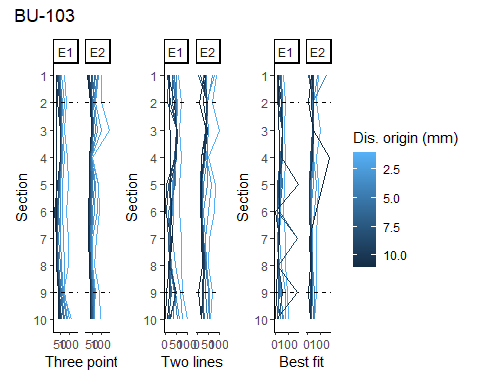
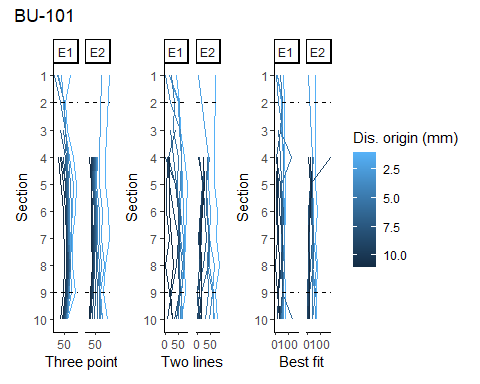
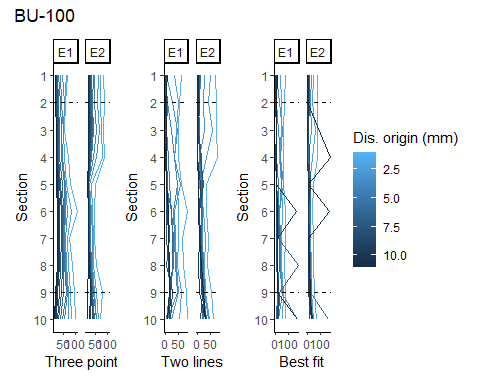
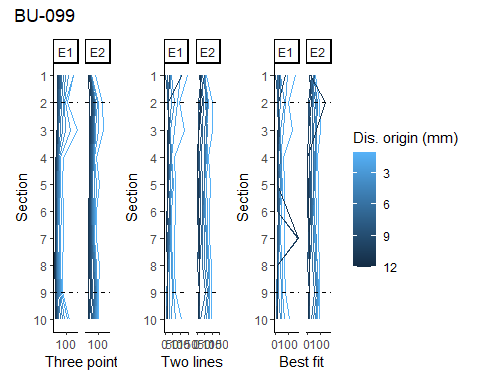
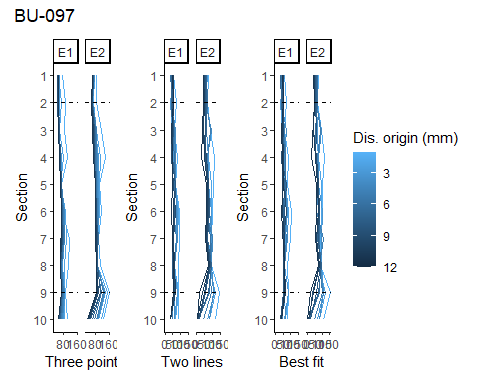
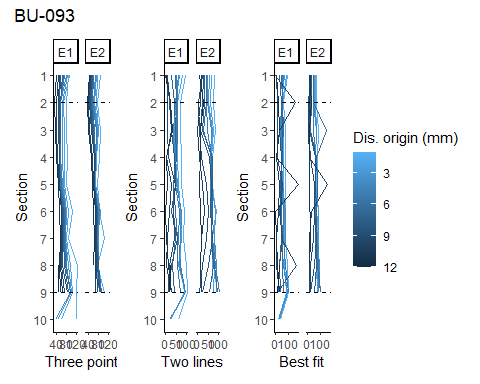
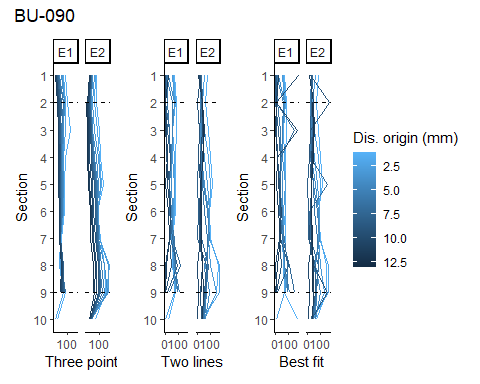
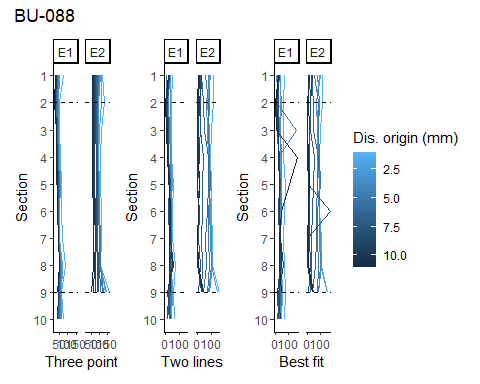
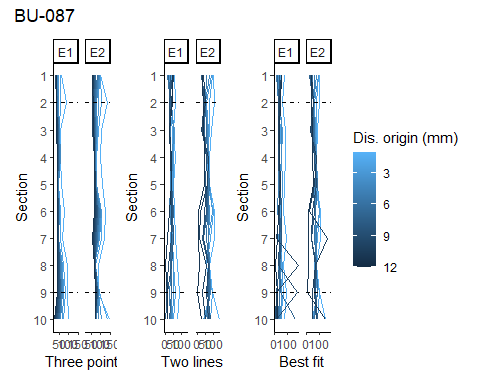
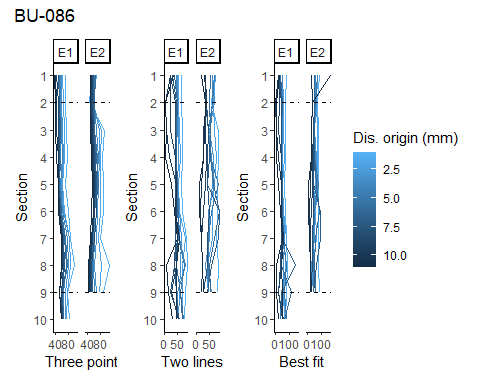
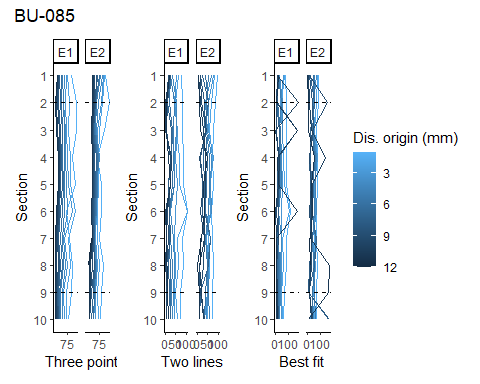
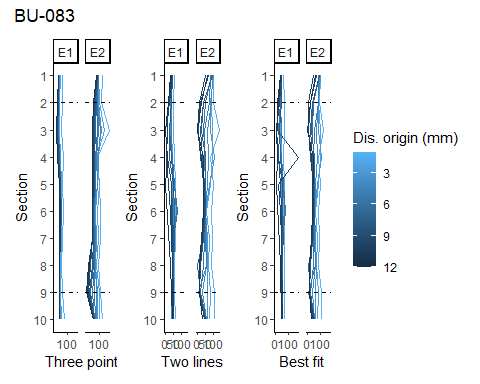
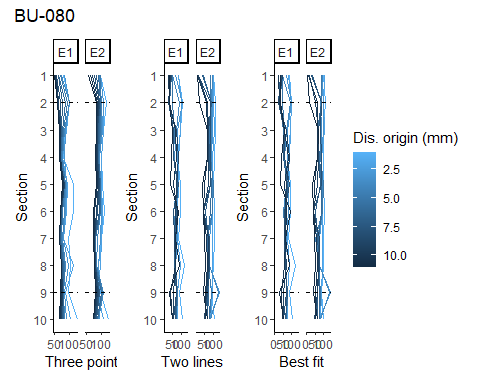
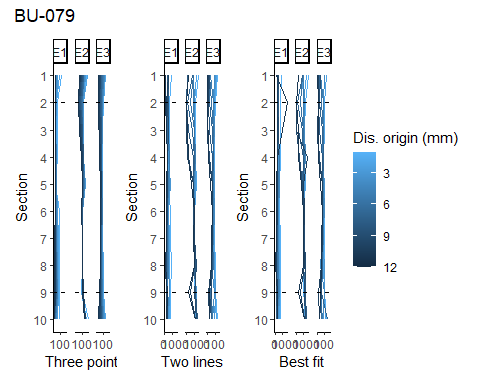
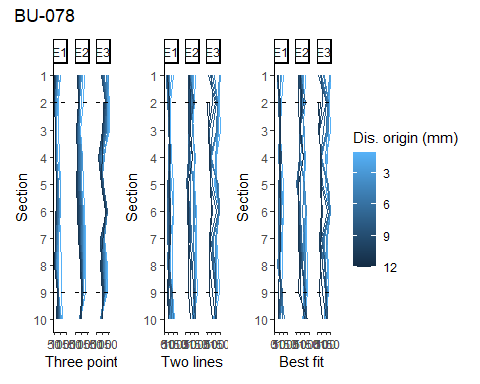
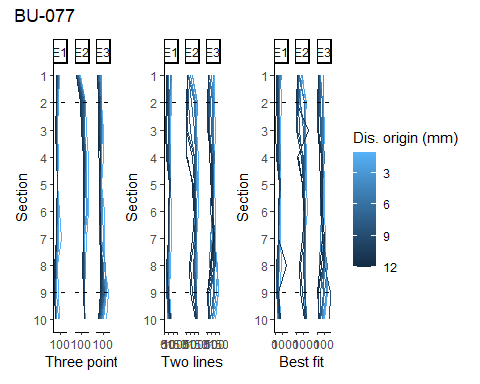
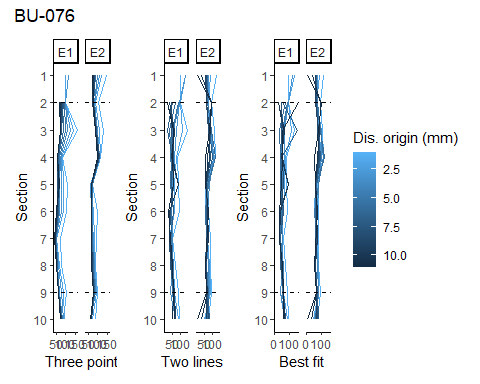
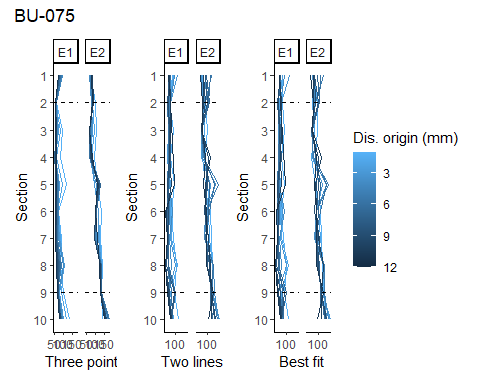
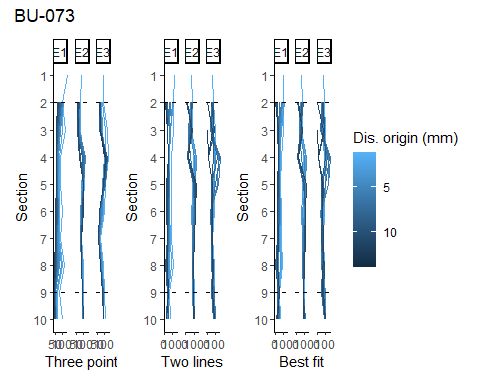
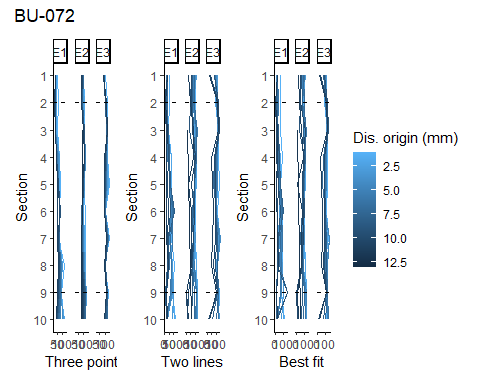
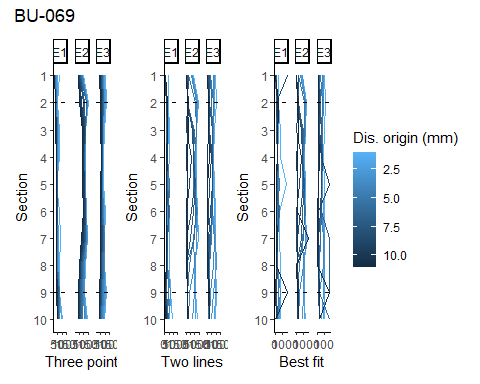
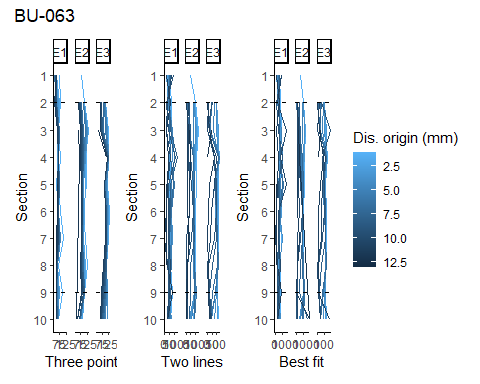
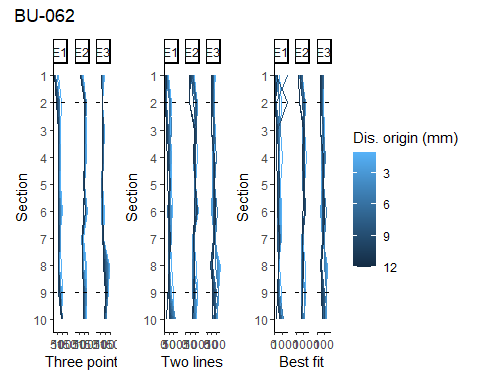
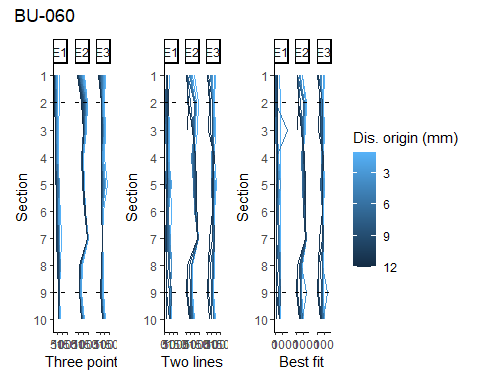
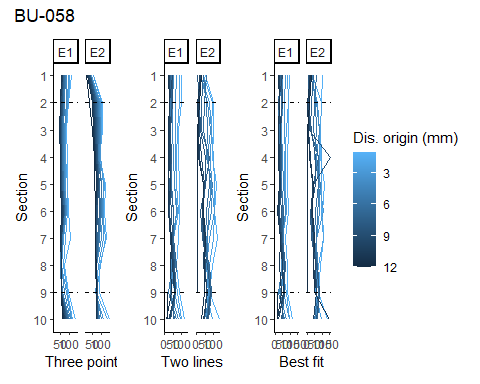
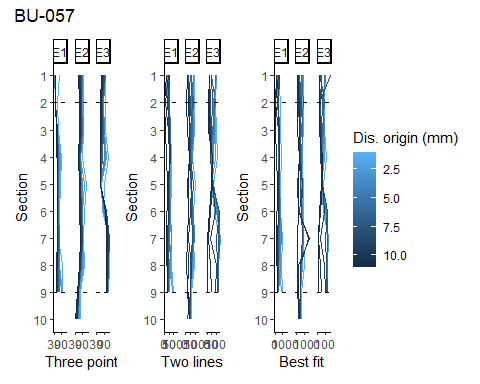
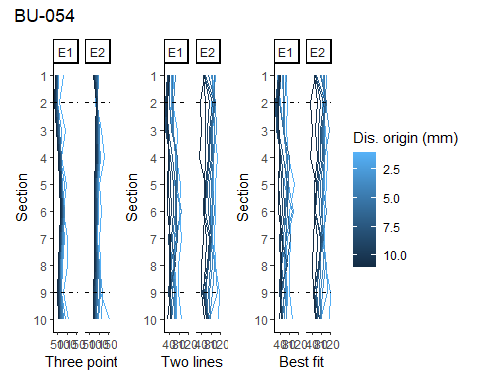
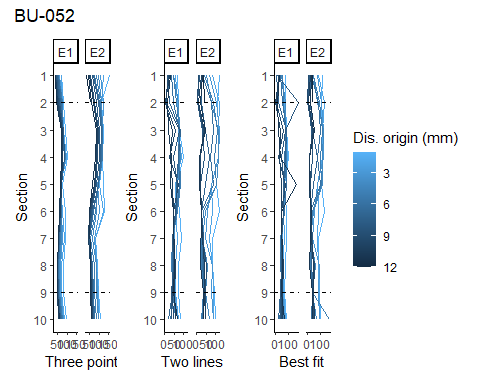
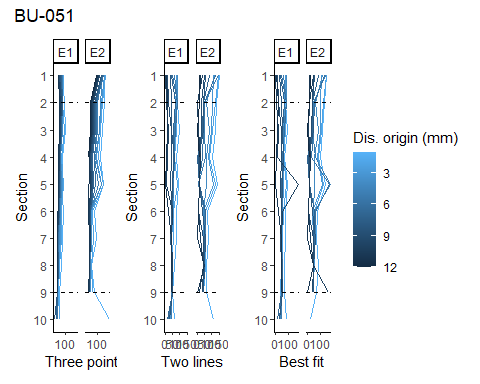
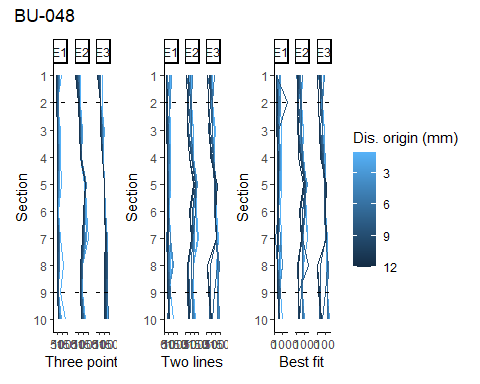
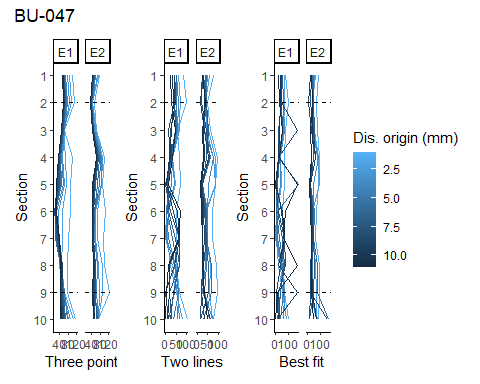
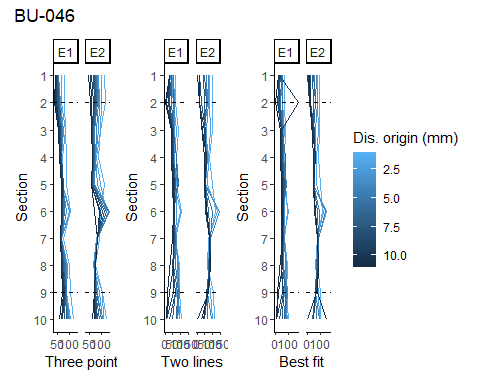
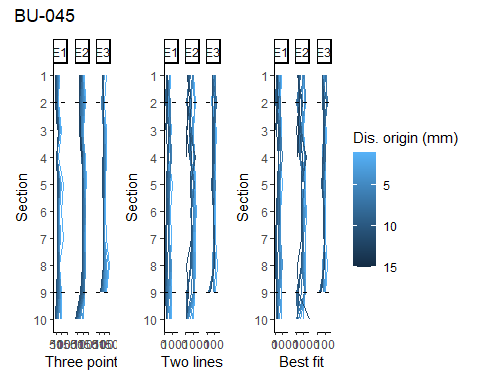
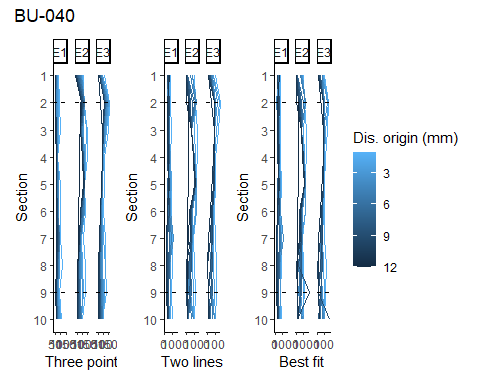
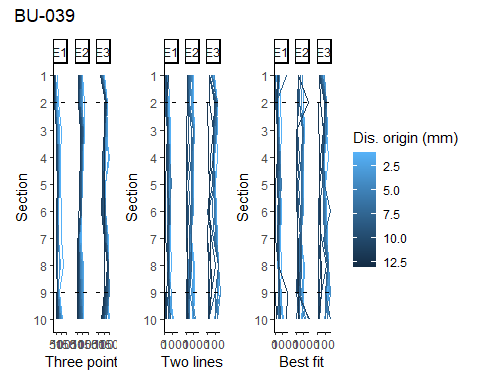
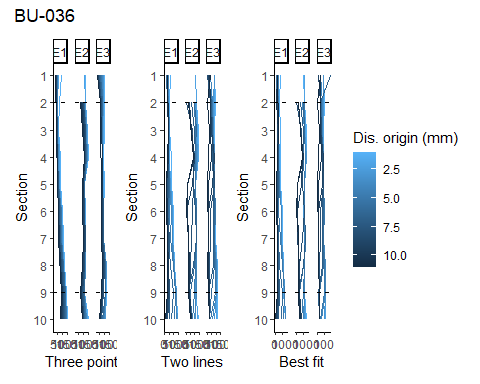
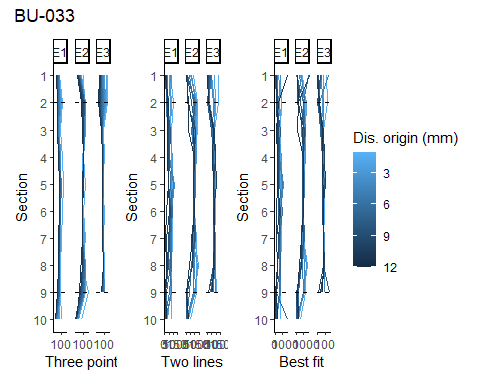
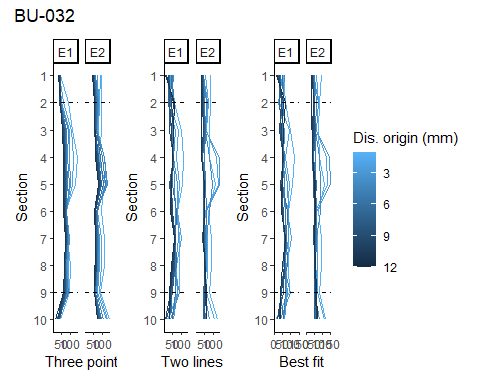
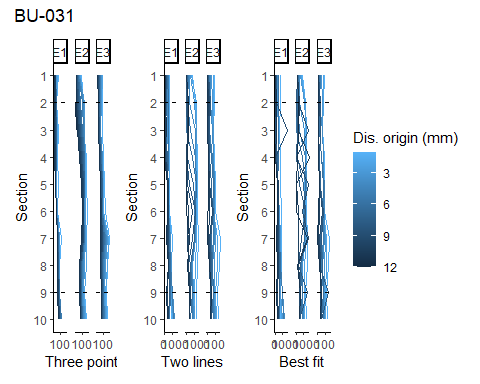
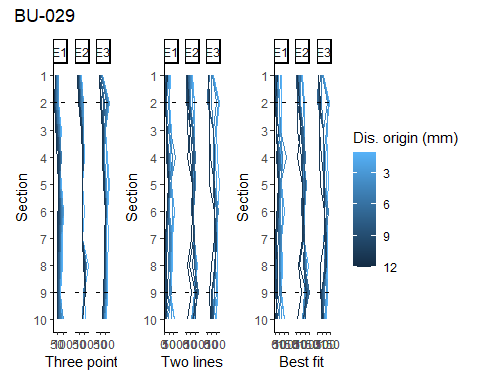
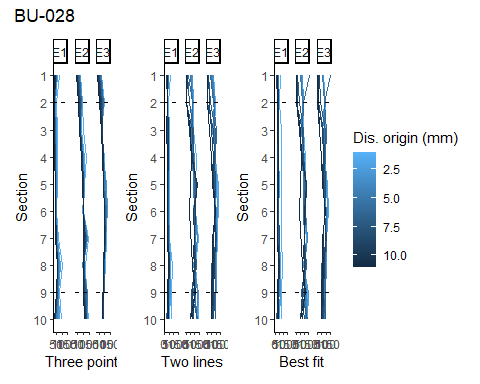
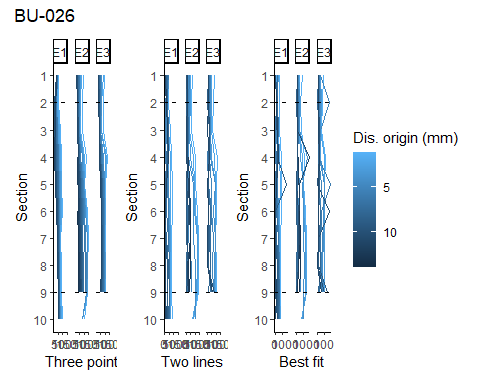
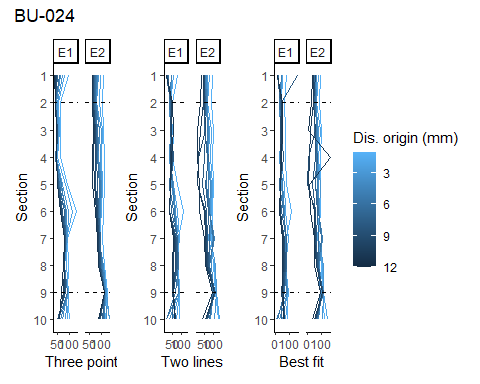
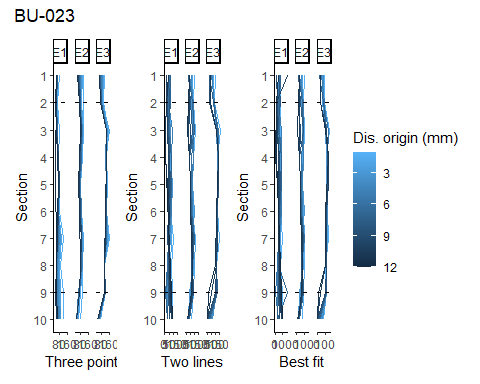
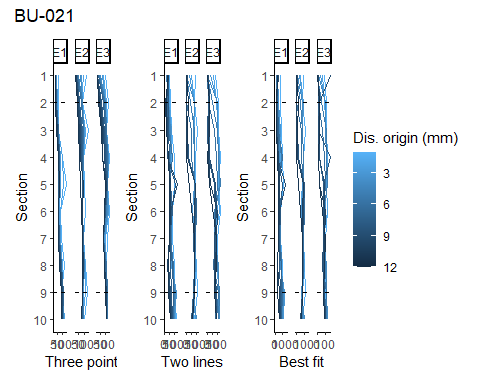
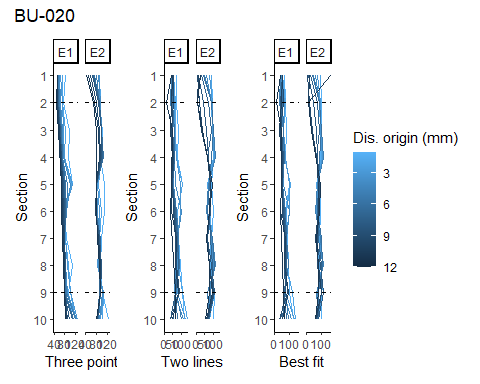
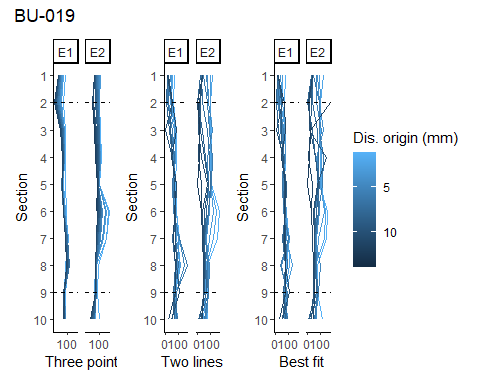
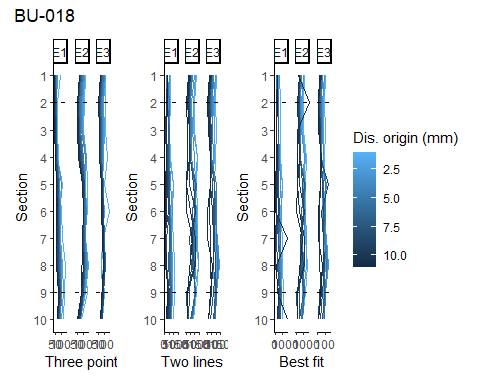
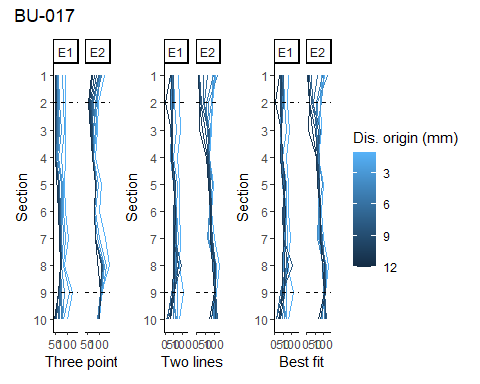
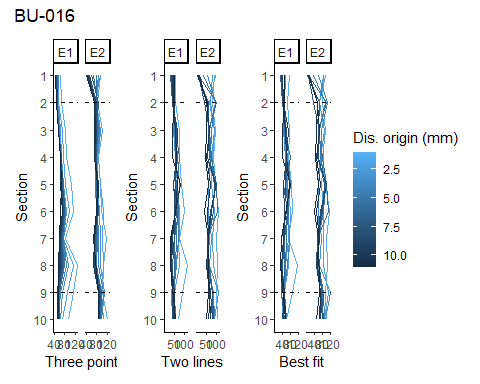
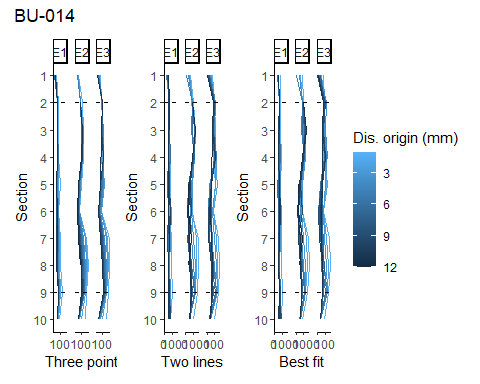
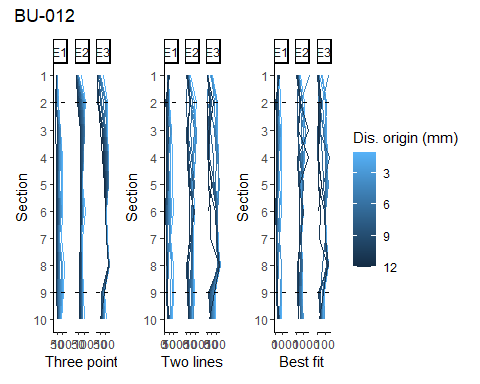
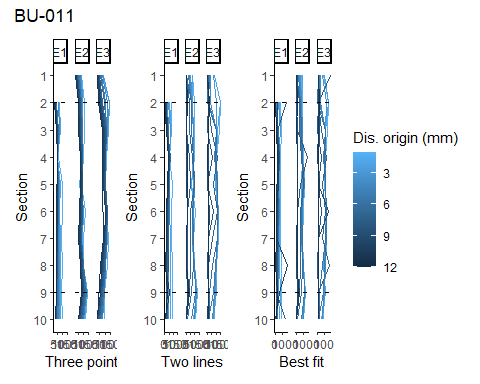
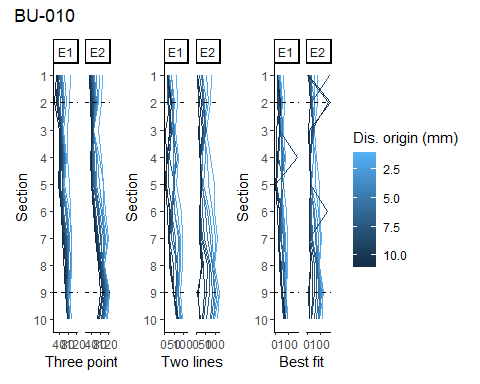
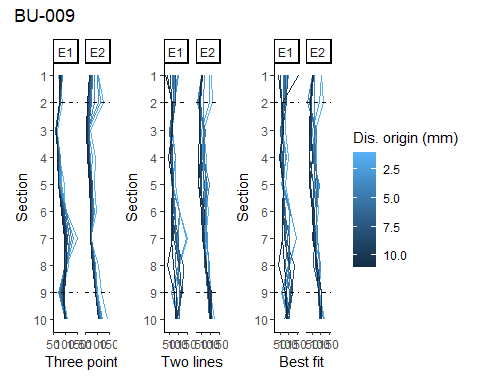
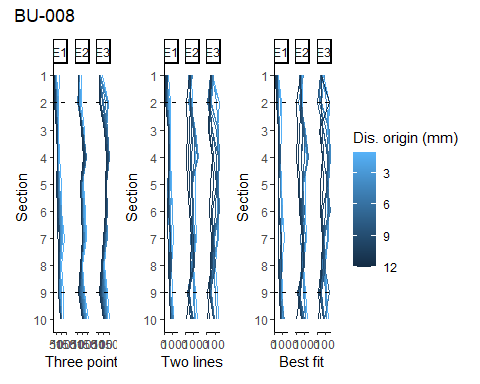
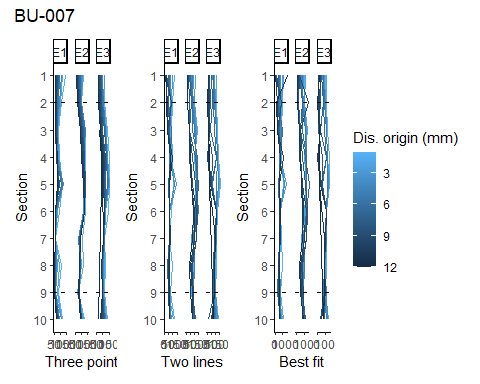
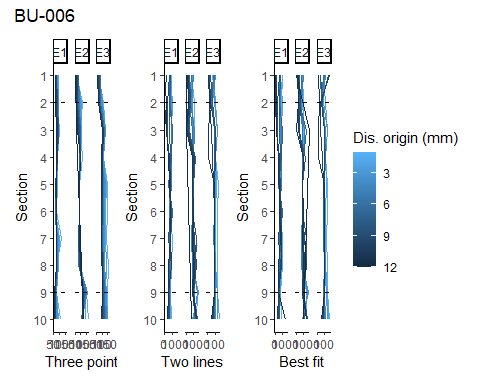
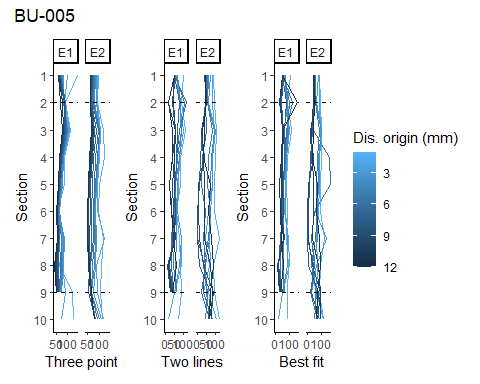
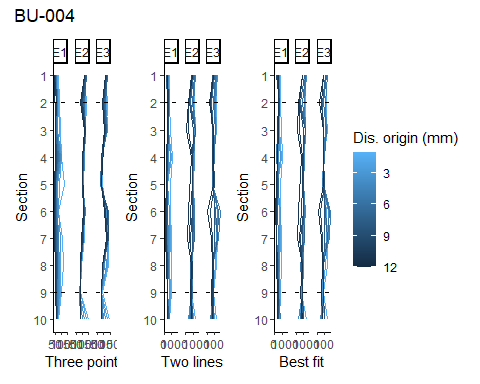
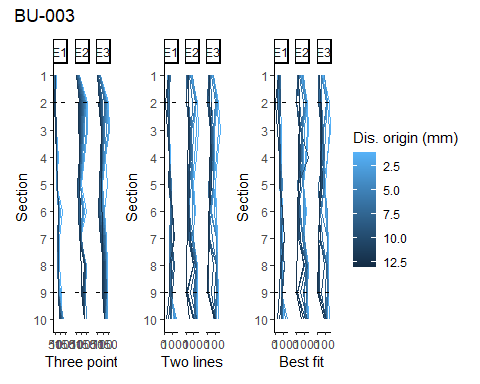
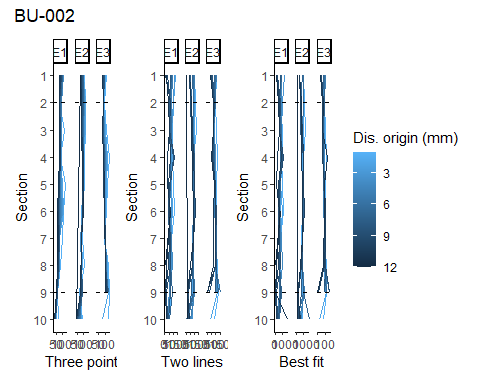
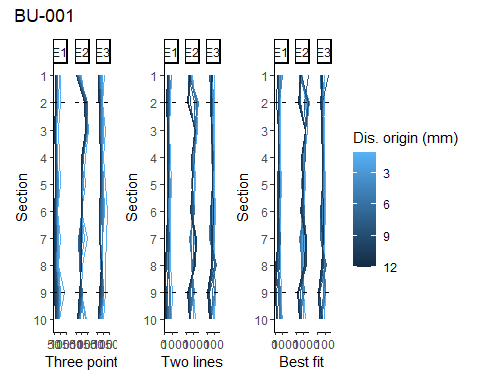
# Define numeric variables

num.var <- 9:length(imp\_data)

# Plot edge angle measurements

## Plots showing the angles as lines

# splits the data in the individual 227 samples  
sp <- split(imp\_data, imp\_data[["ID"]])  
  
for (j in seq\_along(sp)) {  
 p <- vector(mode = "list", length = length(num.var))  
 names(p) <- names(sp[[j]])[num.var]  
  
 for (i in seq\_along(num.var)){   
 p[[i]] <- ggplot(data = sp[[j]], aes\_string(y = "Section",  
 x = names(sp[[j]])[num.var[i]], colour = "Angle\_number")) +  
 geom\_line(aes(group = Angle\_number), orientation = "y") +   
 geom\_hline(yintercept = c(2, 9), linetype = "dashed") +  
 facet\_wrap(~ Edge) +  
 scale\_colour\_continuous(trans = "reverse") +  
 scale\_y\_continuous(breaks=1:10, trans = "reverse") +  
 labs(y = "Section") +   
 labs(colour = "Dis. origin (mm)") +   
 labs(x = gsub("\_", " ", names(sp[[j]])[num.var[i]])) +   
 scale\_x\_continuous(n.breaks = 3) +  
 theme\_classic()   
 }  
  
wp <- wrap\_plots(p) + plot\_annotation(title = names(sp)[j]) +   
 plot\_layout(guides = "collect")  
  
print(wp)  
  
 # save to PDF  
 file\_out <- paste0(file\_path\_sans\_ext(info\_in[["file"]]), "\_EA\_plot\_", names(sp)[j],  
 ".pdf")  
 ggsave(filename = file\_out, plot = wp, path = dir\_out,   
 device = "pdf", width = 260, height = 170, units = "mm")  
}



The files will be saved as “~/analysis/plots.[ext]”.

# sessionInfo() and RStudio version

sessionInfo()

R version 4.0.2 (2020-06-22)  
Platform: x86\_64-w64-mingw32/x64 (64-bit)  
Running under: Windows 10 x64 (build 19041)  
  
Matrix products: default  
  
locale:  
[1] LC\_COLLATE=German\_Germany.1252 LC\_CTYPE=German\_Germany.1252   
[3] LC\_MONETARY=German\_Germany.1252 LC\_NUMERIC=C   
[5] LC\_TIME=German\_Germany.1252   
  
attached base packages:  
[1] tools stats graphics grDevices utils datasets methods   
[8] base   
  
other attached packages:  
 [1] openxlsx\_4.2.3 ggrepel\_0.9.1 doBy\_4.6.8 patchwork\_1.1.1   
 [5] forcats\_0.5.1 stringr\_1.4.0 dplyr\_1.0.3 purrr\_0.3.4   
 [9] readr\_1.4.0 tidyr\_1.1.2 tibble\_3.0.6 tidyverse\_1.3.0   
[13] ggplot2\_3.3.3 R.utils\_2.10.1 R.oo\_1.24.0 R.methodsS3\_1.8.1  
  
loaded via a namespace (and not attached):  
 [1] Rcpp\_1.0.6 lubridate\_1.7.9.2 lattice\_0.20-41 assertthat\_0.2.1   
 [5] digest\_0.6.27 R6\_2.5.0 cellranger\_1.1.0 backports\_1.2.1   
 [9] reprex\_1.0.0 evaluate\_0.14 highr\_0.8 httr\_1.4.2   
[13] pillar\_1.4.7 rlang\_0.4.10 readxl\_1.3.1 rstudioapi\_0.13   
[17] Matrix\_1.2-18 rmarkdown\_2.6 labeling\_0.4.2 munsell\_0.5.0   
[21] broom\_0.7.4 compiler\_4.0.2 Deriv\_4.1.2 modelr\_0.1.8   
[25] xfun\_0.20 pkgconfig\_2.0.3 htmltools\_0.5.1.1 tidyselect\_1.1.0   
[29] crayon\_1.4.0 dbplyr\_2.0.0 withr\_2.4.1 MASS\_7.3-51.6   
[33] grid\_4.0.2 jsonlite\_1.7.2 gtable\_0.3.0 lifecycle\_0.2.0   
[37] DBI\_1.1.1 magrittr\_2.0.1 scales\_1.1.1 zip\_2.1.1   
[41] cli\_2.3.0 stringi\_1.5.3 farver\_2.0.3 fs\_1.5.0   
[45] xml2\_1.3.2 ellipsis\_0.3.1 generics\_0.1.0 vctrs\_0.3.6   
[49] glue\_1.4.2 hms\_1.0.0 yaml\_2.2.1 colorspace\_2.0-0   
[53] rvest\_0.3.6 knitr\_1.31 haven\_2.3.1

RStudio version 1.3.1073.

END OF SCRIPT