

SF10 hox and wnt boxplots

NSMR

```
library(readr)
library(ggplot2)
library(gridExtra)
library(grid)
library(ggpubr)
library(cowplot)
```

```
##
## Attaching package: 'cowplot'
## The following object is masked from 'package:ggpubr':
##
##   get_legend
```

```
library(RColorBrewer)
```

Now we'll load up the data, change iteration/phylo_hypothesis to factor type data

```
df_wnt <- readr::read_csv("wnt.tidydf.csv")
```

```
## Parsed with column specification:
## cols(
##   node = col_character(),
##   taxon = col_character(),
##   species = col_character(),
##   random = col_character(),
##   block_id = col_double(),
##   iteration = col_double(),
##   density = col_double(),
##   acc_ls = col_character(),
##   total_density = col_double(),
##   density_ratio = col_double(),
##   multi_sp = col_character(),
##   para = col_character()
## )
```

```
df_hox <- readr::read_csv("hox.tidydf.csv")
```

```
## Parsed with column specification:
## cols(
##   node = col_character(),
##   taxon = col_character(),
##   species = col_character(),
##   random = col_character(),
##   block_id = col_double(),
##   iteration = col_double(),
##   density = col_double(),
```

```
## acc_ls = col_character(),
## total_density = col_double(),
## density_ratio = col_double(),
## multi_sp = col_character(),
## para = col_character()
## )
```

Here we define a function to make boxplots of the supp figure.

```
map_signif_level <- c(`****` = 1e-04, `***` = 0.001, `**` = 0.01, `*` = 0.05, ns = 1)

make_plot <- function(tbl,
  key = "observed",
  comparisons = list(c("observed", "random")),
  bracket_y = NULL,
  ylims = c(-2.5, 2.5)) {

  if(is.null(bracket_y)) {
    h = ylims[2] - ylims[1]
    bracket_y = c(.9,.825,.75)*h + ylims[1]
  }

  size.summary <- tbl %>% dplyr::filter(random == "observed") %>% dplyr::group_by(taxon) %>% dplyr::summarize(
    log10_density_ratio = log10(density_ratio))
  ggplot(tbl, aes_string(x = 'random', y = 'log10_density_ratio', fill = 'random')) +
    geom_boxplot(outlier.shape = NA) +
    facet_grid(~ taxon) +
    theme_cowplot() +
    theme(axis.title.x = element_blank(), axis.text.x = element_blank()) +
    geom_signif(comparisons = comparisons,
      test = "wilcox.test", test.args = list(paired = FALSE, exact = FALSE), na.rm = TRUE,
      map_signif_level = map_signif_level,
      color="black", tip_length = 0.01, size = .5, textsize = 2,
      y_position = bracket_y, data = NULL) +
    scale_y_continuous(name = "log10(Density ratio)", limits = c(-2.5, 2.5)) +
    theme(legend.title = element_blank(),
      plot.margin = unit(c(1,0,0,0), units='cm'),
      legend.position = 'bottom',
      legend.justification = 'center',
      strip.text = element_text(size = 6, angle = 90, margin = margin(5,0,5,0,'pt')),
      axis.ticks.x = element_blank(),
      axis.title.y = element_text(size = 7),
      axis.text = element_text(size = 6)) +
    geom_text(data=size.summary, aes(x=1,y=2.2,hjust = 0.5,label = label), size = 2, inherit.aes=F)
}
```

Modify data format to make it easy to use

```
df_wnt$taxon <- factor(df_wnt$taxon, levels=c('Poriferan','Ctenophore','Placozoan','Cnidarian', 'Acoel'))
df_wnt$node <- as.factor(df_wnt$node)
df_wnt$random <- as.factor(df_wnt$random)
df_wnt$species <- as.factor(df_wnt$species)
df_wnt$log10_density_ratio <- log10(df_wnt$density_ratio)

df_hox$taxon <- factor(df_hox$taxon, levels=c('Poriferan','Ctenophore','Placozoan','Cnidarian', 'Acoel'))
df_hox$node <- as.factor(df_hox$node)
df_hox$random <- as.factor(df_hox$random)
```

```
df_hox$species <- as.factor(df_hox$species)
df_hox$log10_density_ratio <- log10(df_hox$density_ratio)
```

Make the plots and save them

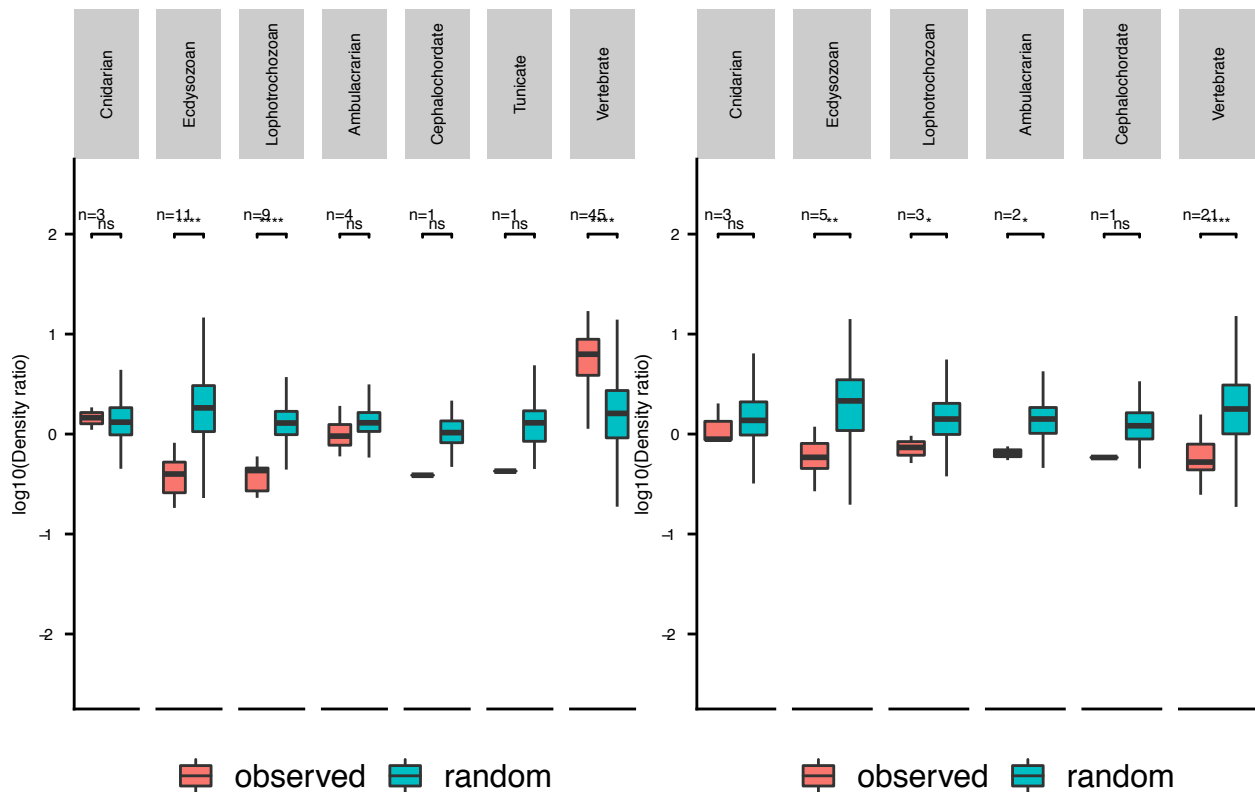
```
hox_p <- make_plot(df_hox)
```

```
## `summarise()` ungrouping output (override with `.groups` argument)
```

```
wnt_p <- make_plot(df_wnt)
```

```
## `summarise()` ungrouping output (override with `.groups` argument)
```

```
gridplot <- gridExtra::grid.arrange(grobs = list(hox_p, wnt_p), ncol = 2)
```



```
ggsave(plot = gridplot,
        filename = 'hox_wnt.pdf',
        unit = 'cm',
        width = 15,
        height = 12)
```