

# 06182024\_PsminthUTL

Jennifer Goff

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```
library(ggplot2)
library(readxl)
library(dplyr)
```

```
##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':
##
##   filter, lag

## The following objects are masked from 'package:base':
##
##   intersect, setdiff, setequal, union
```

```
library(plotrix)
library(tinytex)
SpeciesVar5 <- read_excel("C:/Users/jenng/Dropbox/2023_Thesis/06062024_GoffThesisDefense/DataSheets/Chap
  sheet = "PsminthUTLs")
attach(SpeciesVar5)
```

Psmnth temperature incorporated once. Performing t-tests to see if there is a significant difference in reported temperatures at species' Northern ranges across time, 1950s and 2020s

```
options(scipen = 999)
tttest.TempNorth <- t.test(SpeciesVar5$"1950North_AvgMaxTemp",
SpeciesVar5$"2020North_AvgMaxTemp", paired=T)
```

```
tttest.TempSouth<- t.test(SpeciesVar5$"1950South_AvgMaxTemp",
SpeciesVar5$"2020South_AvgMaxTemp",paired=T)
```

Creating data frame matrix

```
DataToPlot <- as.data.frame(matrix(nrow = 4, ncol= 2))
colnames(DataToPlot) <- c("Category", "Value")
DataToPlot[1,1] <- "1950North"
DataToPlot[2,1] <- "2020North"
DataToPlot[3,1] <- "1950South"
DataToPlot[4,1] <- "2020South"
```

```
DataToPlot[1,2] <- mean(SpeciesVar5$`1950North_AvgMaxTemp`)
DataToPlot[2,2] <- mean(SpeciesVar5$`2020North_AvgMaxTemp`)
DataToPlot[3,2] <- mean(SpeciesVar5$`1950South_AvgMaxTemp`)
DataToPlot[4,2] <- mean(SpeciesVar5$`2020South_AvgMaxTemp`)
```

```
#Base R plot
row.names(DataToPlot) <- DataToPlot$Category
DataToPlot2 <- DataToPlot[,2]
names(DataToPlot2) <- DataToPlot$Category
DataToPlot3 <- matrix(nrow = 2, ncol = 2)
row.names(DataToPlot3) <- c("1950's", "2020's")
colnames(DataToPlot3) <- c("North", "South")
DataToPlot3[1,1] <- as.numeric(DataToPlot2[1])
DataToPlot3[1,2] <- as.numeric(DataToPlot2[3])
DataToPlot3[2,1] <- as.numeric(DataToPlot2[2])
DataToPlot3[2,2] <- as.numeric(DataToPlot2[4])
```

We want standard error of numbers

```
PlotSErr <- DataToPlot3
PlotSErr[1,1] <- std.error(SpeciesVar5$`1950North_AvgMaxTemp`)
PlotSErr[1,2] <- std.error(SpeciesVar5$`1950South_AvgMaxTemp`)
PlotSErr[2,1] <- std.error(SpeciesVar5$`2020North_AvgMaxTemp`)
PlotSErr[2,2] <- std.error(SpeciesVar5$`2020South_AvgMaxTemp`)
```

```
data <- data.frame(
  Group = factor(c("1950's", "2010's", "1950's", "2010's")),
  Value = c(18.41, 19.69, 26.42,
            27.47),
  StdError = c(1.45, 1.44, 1.22, 1.19),
  Pair = factor(c("Northern range", "Northern range",
                 "Southern range", "Southern range"))
)
```

```
data$Lower <- data$Value - data$StdError
data$Upper <- data$Value + data$StdError
```

```
data$Group <- factor(data$Group, levels = unique(data$Group))
```

```
Temp <- ggplot(data, aes(x = Group, y = Value)) +
  geom_bar(stat = "identity", fill = c("blue", "red", "blue", "red"),
           position = position_dodge()) +
  geom_errorbar(aes(ymin = Lower, ymax = Upper),
               width = 0.2, position = position_dodge()) +
  facet_wrap(~ Pair, nrow = 1, scales = "free_x") +
  theme_bw()
Temp + xlab("") + ylab("Average daily maximum temperatures
\n during flight season")
```

