In Vitro Aphid Choice UV

Contents

Load Libraries

```
pacman::p_load(ggplot2, readxl, ggbeeswarm, readr, dplyr, tidyr, tidyverse, devtools,
    cowplot, knitr, emmeans, lme4, lmerTest, RColorBrewer, viridis, install = FALSE)
```

Load Data

```
aphid_choice_raw <- read_excel("data/alate_choice_in_vitro.xlsx") %>%
    mutate(block = as.factor(block))
```

Summarize aphid counts

```
aphid_choice_sum <- aphid_choice_raw %>%
  group_by(block, treatment, box, UV) %>%
  summarize(
    total_alates_4_hrs = sum(alates_4_hrs),
    total_nymphs_4_hrs = sum(nymphs_4_hrs),
    total_alates_24_hrs = sum(alates_24_hrs),
    total_nymphs_24_hrs = sum(nymphs_24_hrs),
    .groups = "drop"
  )

# reshape
aphid_choice_sum <- aphid_choice_sum %>%
```

```
  filter(treatment %in% c("220_supernatant", "PPM")) %>%   # Keep only relevant treatments
  pivot_wider(
    names_from = treatment,
    values_from = c(total_alates_4_hrs, total_nymphs_4_hrs, total_alates_24_hrs, total_nymphs_24_hrs),
    names_glue = "{.value}_{treatment}"
  ) %>%
  select(block, box, UV,
         alates_220_supernatant_4_hrs = total_alates_4_hrs_220_supernatant,
         alates_PPM_4_hrs = total_alates_4_hrs_PPM,
         nymphs_220_supernatant_4_hrs = total_nymphs_4_hrs_220_supernatant,
         nymphs_PPM_4_hrs = total_nymphs_4_hrs_PPM,
         alates_220_supernatant_24_hrs = total_alates_24_hrs_220_supernatant,
         alates_PPM_24_hrs = total_alates_24_hrs_PPM,
         nymphs_220_supernatant_24_hrs = total_nymphs_24_hrs_220_supernatant,
         nymphs_PPM_24_hrs = total_nymphs_24_hrs_PPM)
```

Calculate percent aphid counts and deviations from 50%

```
# separate by box calculate percents
aphid_choice_percent_box <- aphid_choice_sum %>%
    group_by(block, box, UV) %>%
    summarize(percent_choice_4hrs = (100 * (alates_220_supernatant_4_hrs/(alates_220_supernatant_4_hrs +
        alates_PPM_4_hrs))))
```

```
## `summarise()` has grouped output by 'block', 'box'. You can override using the
## `.groups` argument.
```

```
# Summarize the data by block and UV, calculating average deviation from 50%
aphid_choice_deviation_box <- aphid_choice_percent_box %>%
    group_by(block, box, UV) %>%
    summarize(average_deviation_50percent_choice_4hrs = abs(50 - percent_choice_4hrs))
```

```
## `summarise()` has grouped output by 'block', 'box'. You can override using the
## `.groups` argument.
```

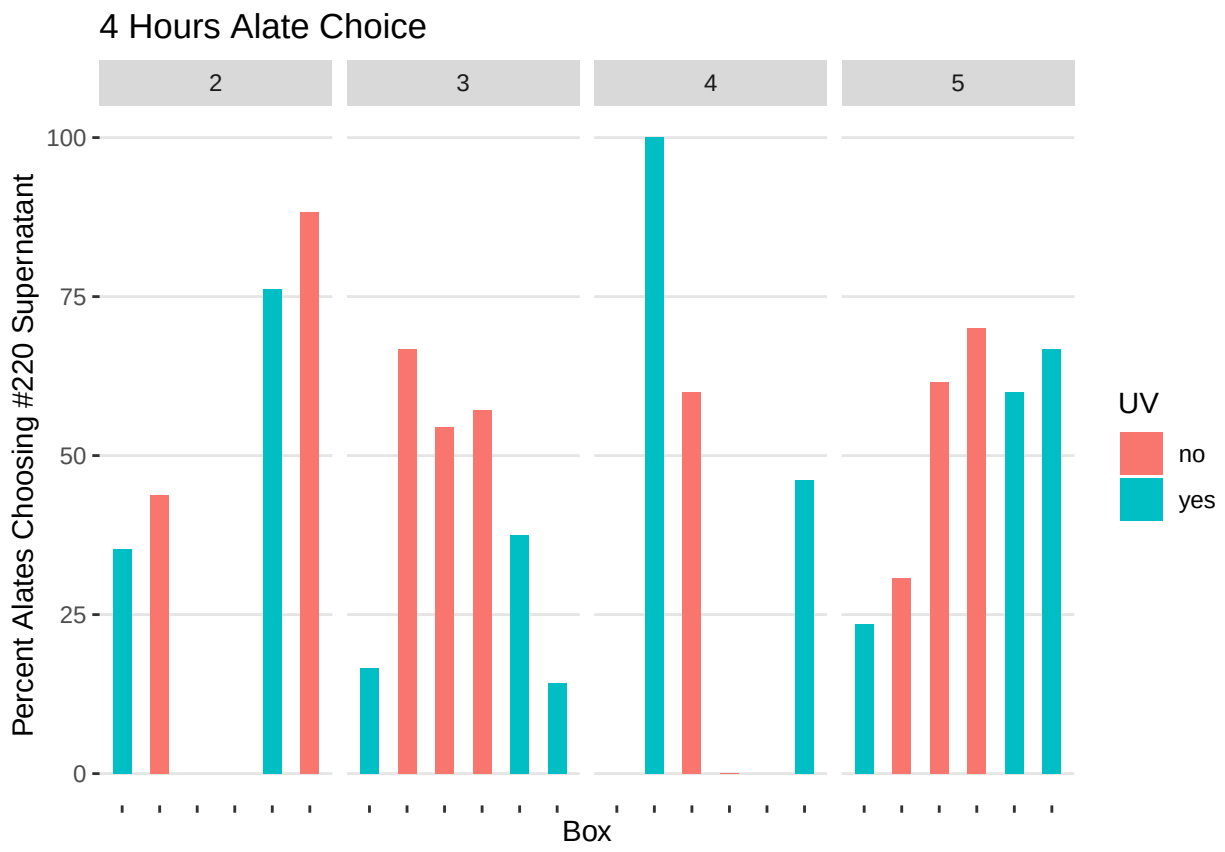
Plots

4 Hour Alate Choice

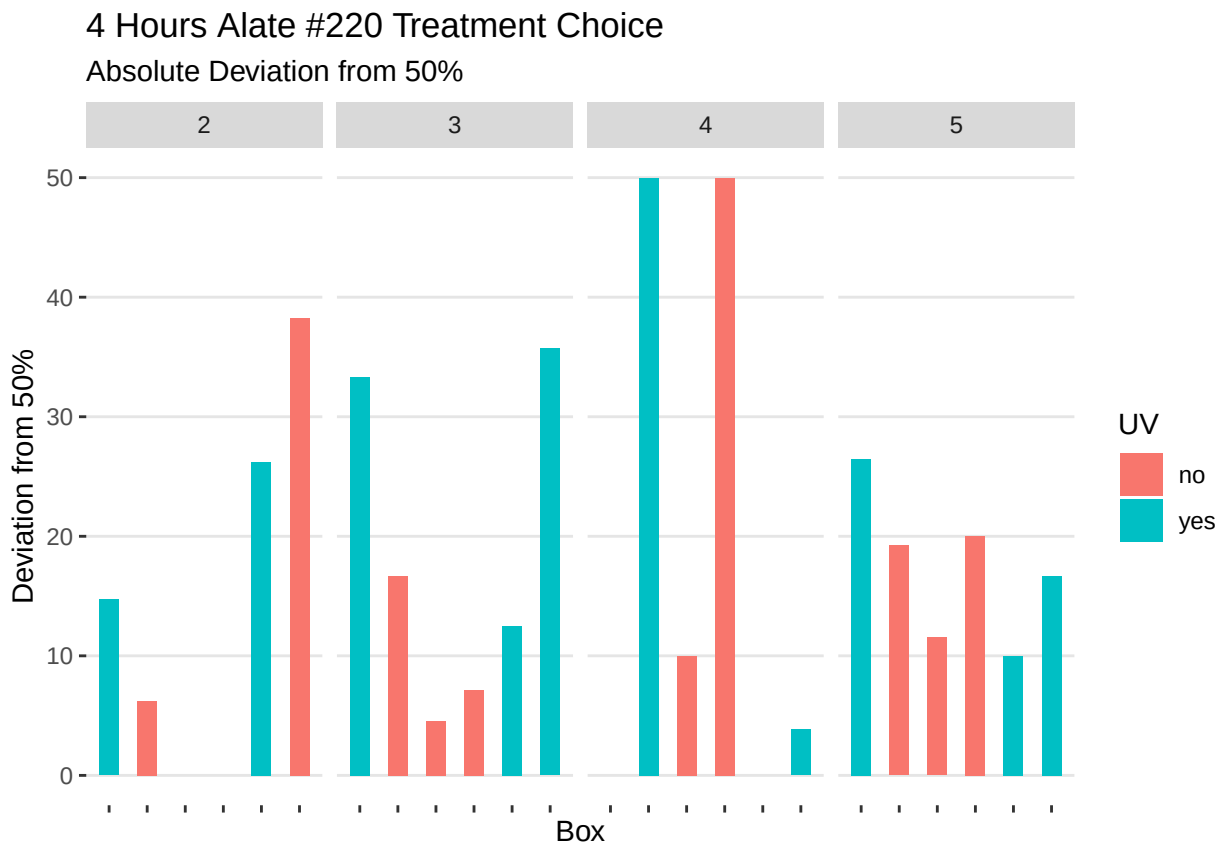
```
# remove block 1
aphid_choice_sum_no_block1 <- aphid_choice_sum %>%
    filter(block != "1")

# plot 4 hour alate choice
ggplot(aphid_choice_sum_no_block1, aes(x = box, y = 100 * (alates_220_supernatant_4_hrs/(alates_220_sup
    alates_PPM_4_hrs)), fill = UV)) + geom_col(width = 0.5) + facet_grid(~block) +
    labs(x = "Box", y = "Percent Alates Choosing #220 Supernatant", title = "4 Hours Alate Choice") +
```

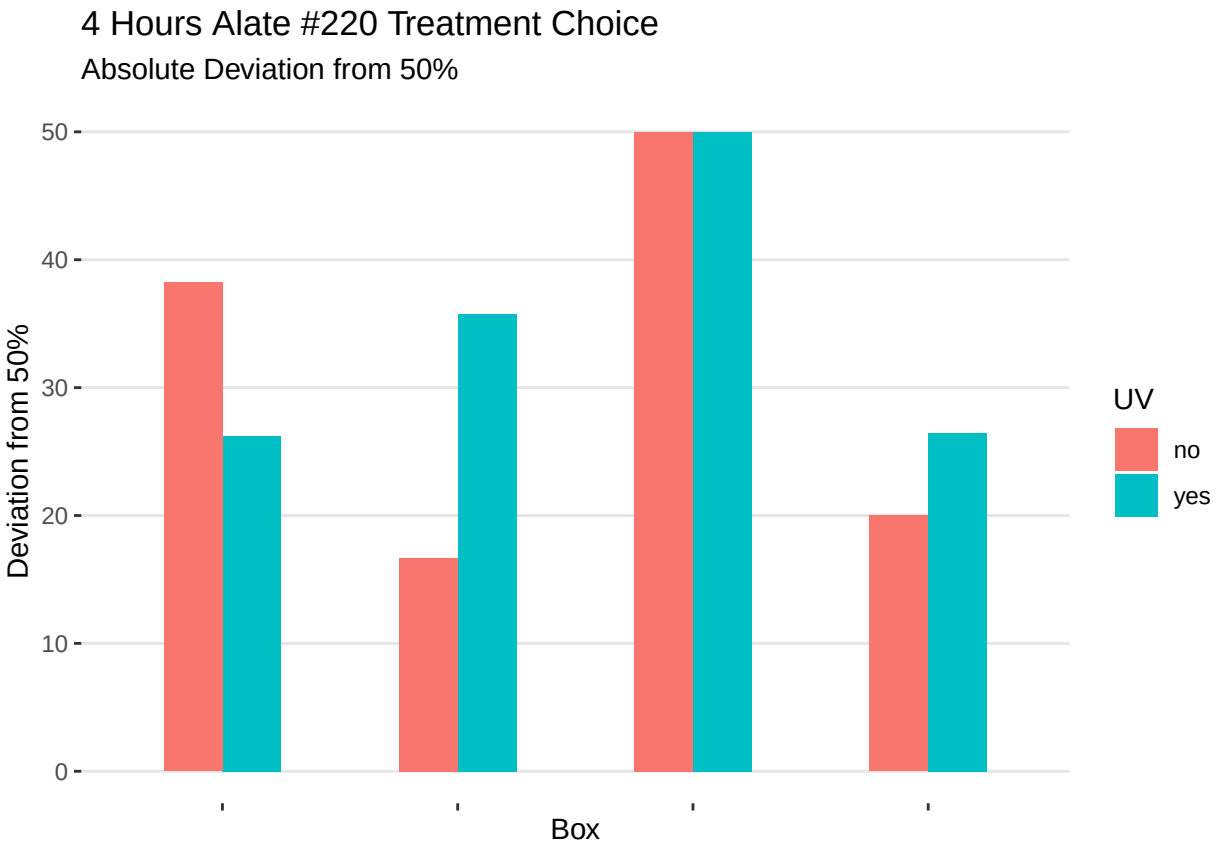
```
    theme(panel.background = element_rect(fill = "white"), panel.grid.major = element_line(color = "gray
        panel.grid.major.x = element_blank(), panel.grid.minor.x = element_blank(),
        axis.text.x = element_blank())  # Removes x-axis labels
```




```
# plot 4 hour alate choice - deviation from 50%
ggplot(aphid_choice_sum_no_block1, aes(x = box, y = abs(50 - (100 * (alates_220_supernatant_4_hrs/(alat
    alates_PPM_4_hrs)))), fill = UV)) + geom_col(width = 0.5) + facet_grid(~block) +
    labs(x = "Box", y = "Deviation from 50%", title = "4 Hours Alate #220 Treatment Choice",
        subtitle = "Absolute Deviation from 50%") + theme(panel.background = element_rect(fill = "white
    panel.grid.major = element_line(color = "gray90"), panel.grid.major.x = element_blank(),
    panel.grid.minor.x = element_blank(), axis.text.x = element_blank())  # Removes x-axis labels
```




```
# plot block level 4 hour alate choice - deviation from 50%
ggplot(aphid_choice_sum_no_block1, aes(x = block, y = abs(50 - (100 * (alates_220_supernatant_4_hrs/(ala
    alates_PPM_4_hrs)))), fill = UV)) + geom_col(position = "dodge", width = 0.5) +
    labs(x = "Box", y = "Deviation from 50%", title = "4 Hours Alate #220 Treatment Choice",
        subtitle = "Absolute Deviation from 50%") + theme(panel.background = element_rect(fill = "white
    panel.grid.major = element_line(color = "gray90"), panel.grid.major.x = element_blank(),
    panel.grid.minor.x = element_blank(), axis.text.x = element_blank())  # Removes x-axis labels
```


4 Hours Alate #220 Treatment Choice
Absolute Deviation from 50%
Deviation from 50%
50
40
30
20
10
0
Box
UV
no
yes