Untitled

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https://www.r4photobiology.info/galleries/plot-timeline.html

```
library(ggplot2)
library(lubridate)
```

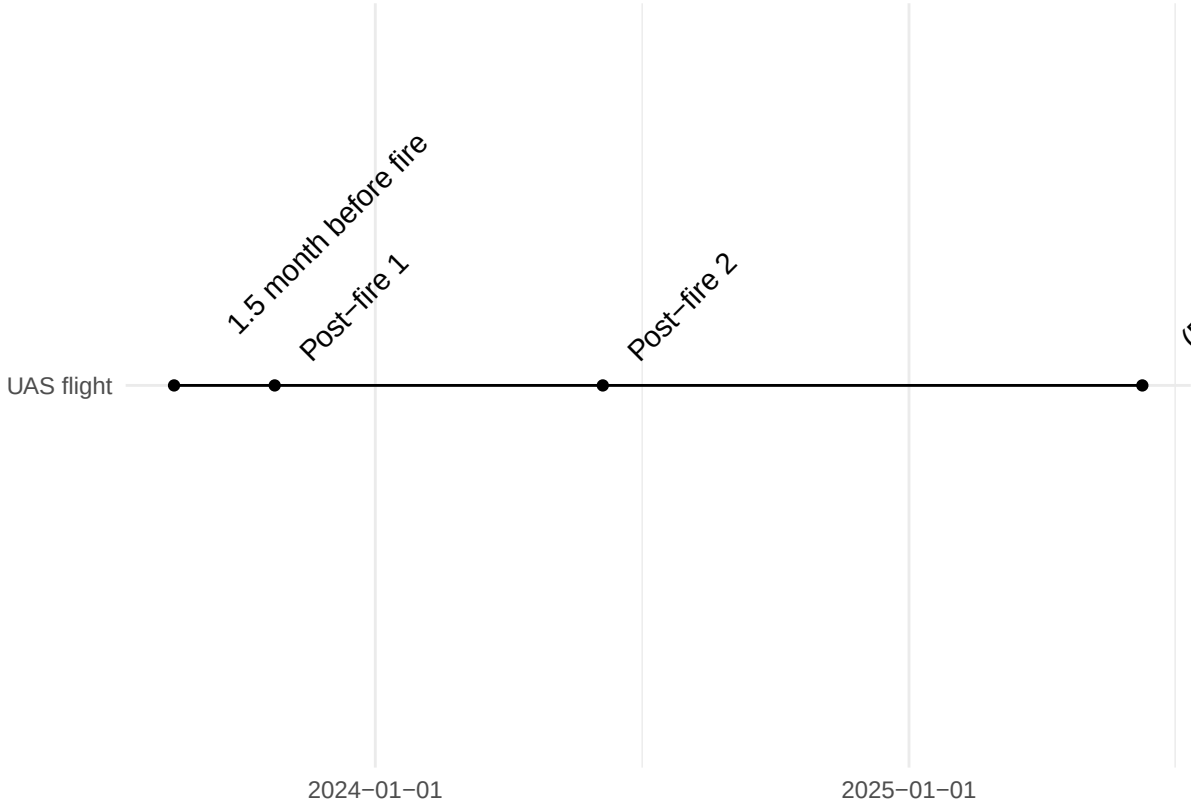
```
##
## Attaching package: 'lubridate'
```

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

```
# install.packages("ggrepel")
library(ggrepel)
```

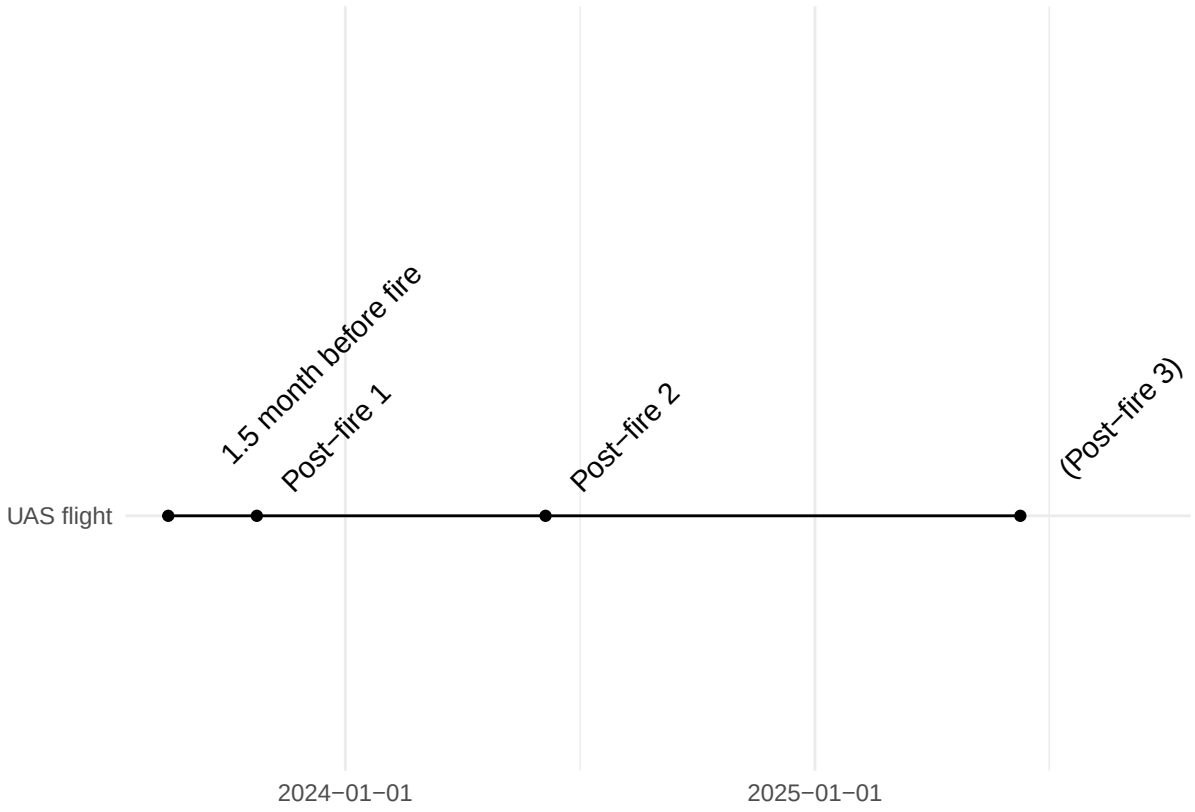
```
issues.tb <-
  data.frame(what = c("1.5 month before fire", "Post-fire 1", "Post-fire 2", " (Post-fire 3) "),
             when = ymd(c("2023-08-16", "2023-10-24", "2024-06-05",
                          "2025-06-10" )),
             event.type = "UAS flight")
```

```
ggplot(issues.tb, aes(x = when, y = event.type, label = what)) +
  geom_line() +
  geom_point() +
  geom_text(hjust = -0.3, angle = 45) +
  scale_x_date(name = "", date_breaks = "1 years") +
  scale_y_discrete(name = "") +
  theme_minimal()
```



We expand the axis on the right and remove some white space from the axis by adjusting the scales' expansion (the default is mult = 0.05).

```
ggplot(issues.tb, aes(x = when, y = event.type, label = what)) +
  geom_line() +
  geom_point() +
  geom_text(hjust = -0.3, angle = 45) +
  scale_x_date(name = "", date_breaks = "1 years",
               expand = expansion(mult = c(0.05, 0.2))) +
  scale_y_discrete(name = "",
                   expand = expansion(mult = c(0.01, 0.02))) +
  theme_minimal()
```

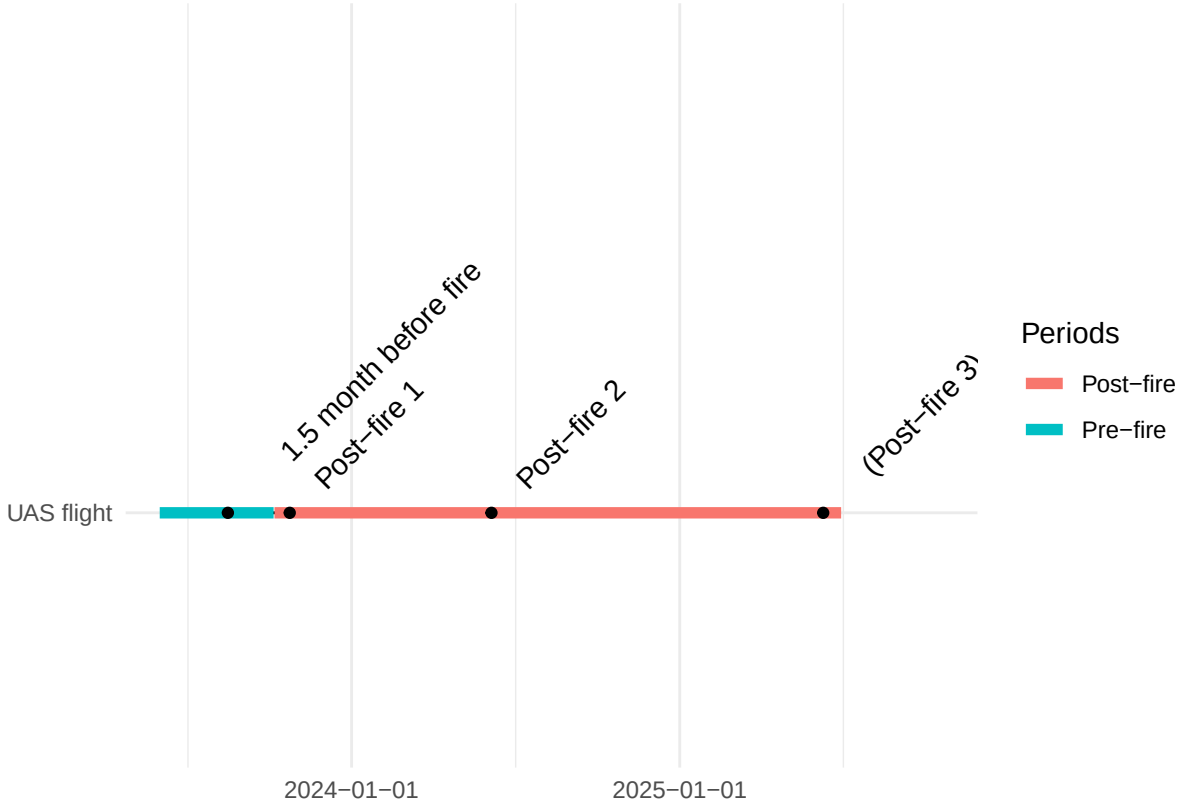



```
plants_periods.tb <-
  data.frame(Periods = c( "Pre-fire", "Post-fire"
    #"seedling\nemergence",                "treatment\nperiod"
                          ),
             start = ymd(c("2023-06-01", "2023-10-07")),
             end = ymd(c("2023-10-06", "2025-06-30")),
             what = "UAS flight")

plants_periods.tb
```

```
##     Periods      start        end       what
## 1  Pre-fire 2023-06-01 2023-10-06 UAS flight
## 2 Post-fire 2023-10-07 2025-06-30 UAS flight
```

```
ggplot(issues.tb, aes(x = when, y = event.type, label = what)) +
  geom_line() +
  geom_segment(data = plants_periods.tb,
               mapping = aes(x = start, xend = end,
                             y = what, yend = what,
                             colour = Periods),
               linewidth = 2)+
  geom_point() +
  geom_text(hjust = -0.3, angle = 45) +
  scale_x_date(name = "", date_breaks = "1 years",
               expand = expansion(mult = c(0.05, 0.2))) +
  scale_y_discrete(name = "",
                   expand = expansion(mult = c(0.01, 0.02))) +
  theme_minimal()
```




```
plants.tb <-
  data.frame(what = c("2023-08-16", "2023-10-24", "2024-06-05", "(2025-06)"
                      ),
             when = ymd(c("2023-08-16", "2023-10-24", "2024-06-05", "2025-06-01"
                          )),
             series = "UAS flight")
plants.tb
```

```
##         what       when     series
## 1 2023-08-16 2023-08-16 UAS flight
## 2 2023-10-24 2023-10-24 UAS flight
## 3 2024-06-05 2024-06-05 UAS flight
## 4  (2025-06) 2025-06-01 UAS flight
```

```
plants_periods.tb <-
  data.frame(Periods = c("Post-fire","Pre-fire"
                      ),
             col=c("red","blue"),
             start = ymd(c(  "2023-10-07","2023-08-01")),
             end = ymd(c(  "2025-06-30" , "2023-10-06")),
             series = "UAS flight")
plants_periods.tb$Periods<-factor(plants_periods.tb$Periods, levels =c( "Pre-fire" , "Post-fire") )
plants_periods.tb
```

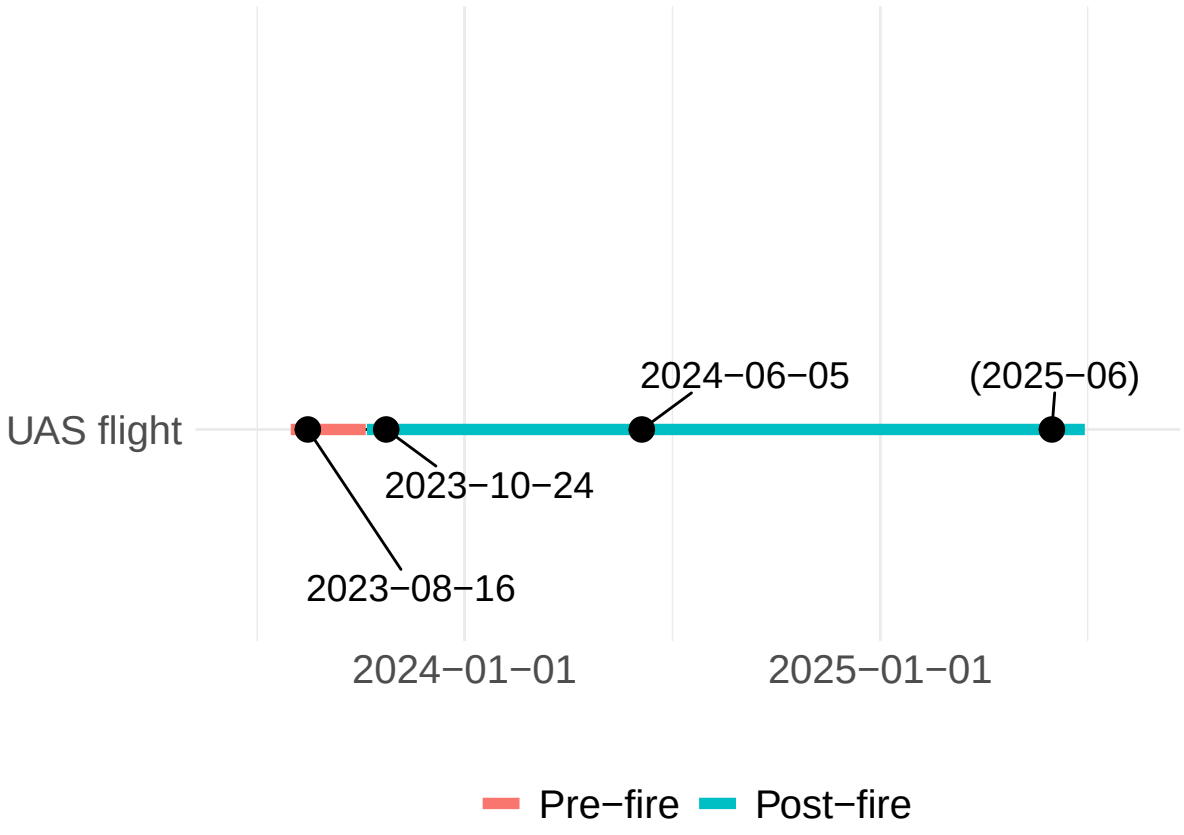
```
##     Periods  col      start        end     series
## 1 Post-fire  red 2023-10-07 2025-06-30 UAS flight
## 2  Pre-fire blue 2023-08-01 2023-10-06 UAS flight
```

```
ggplot(plants.tb, aes(x = when, y = series)) +
  geom_line() +
```

```
geom_segment(data = plants_periods.tb,
             mapping = aes(x = start, xend = end,
                           y = series, yend = series,
                           colour = Periods
                             ),
            # col=plants_periods.tb$col,
             linewidth = 2) +
geom_point(size = 4) +
geom_text_repel(aes(label = what),
                size = 5,
                direction = "y",
                point.padding = 0.5,
                hjust = 0,
                box.padding = 1,
                seed = 123) +
scale_x_date(name = "", date_breaks = "1 year",
             #date_labels = "%d %B",
             expand = expansion(mult = c(0.12, 0.12))) +
scale_y_discrete( name = "",
                  expand = expansion(mult = c(1,  2) )) +
theme_minimal() +
theme(legend.position = "bottom",

      axis.title.x = element_text(size = 15),
  axis.title.y = element_text(size = 15),
  axis.text.x = element_text(size = 15),
  axis.text.y = element_text(size = 15),

      legend.title = element_text(size = 0),
  legend.text = element_text(size = 15)
      )
```


UAS flight
2024−06−05
(2025−06)
2023−10−24
2023−08−16
2024−01−01
2025−01−01
Pre−fire
Post−fire