

# AUDPC Analysis

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## Background

Rmarkdown is great for combining code and notes into cohesive reports on analyses. In this example, I will be using data found on [this tutorial](#) to explore the effects of wheat cultivar and fungicide treatment on the incidence of disease caused by *Puccinia striiformis* (stripe rust). I will do this by comparing the **AUDPC** (area under disease progress curve) for the three cultivars and two fungicide treatments.

## Analysis

To accomplish this, I will do the following:

1. Parse the file using `read.csv`
2. Tidy up the data using `reshape2` and `dplyr` functions
3. Graph the data using `ggplot2`

### Parse data set

```
data <- read.csv("fungicide_example.csv")
```

### Tidy up data set

More information on “Tidy” data can be found [here](#).

```
library('dplyr')
library('reshape2')
long_data <- data %>%
  melt(id.vars = "Julian.Date", value.name = "disease") %>% # long form
  mutate(fungicide = grepl(pattern = "\\.[Tt]rt$", variable)) %>% # add fungicide column
  transform(fungicide = ifelse(fungicide, "treated", "untreated")) %>% # make it sensible
  transform(variable = gsub("\\.[Tt]rt$", "", variable)) # clean up the variable
```

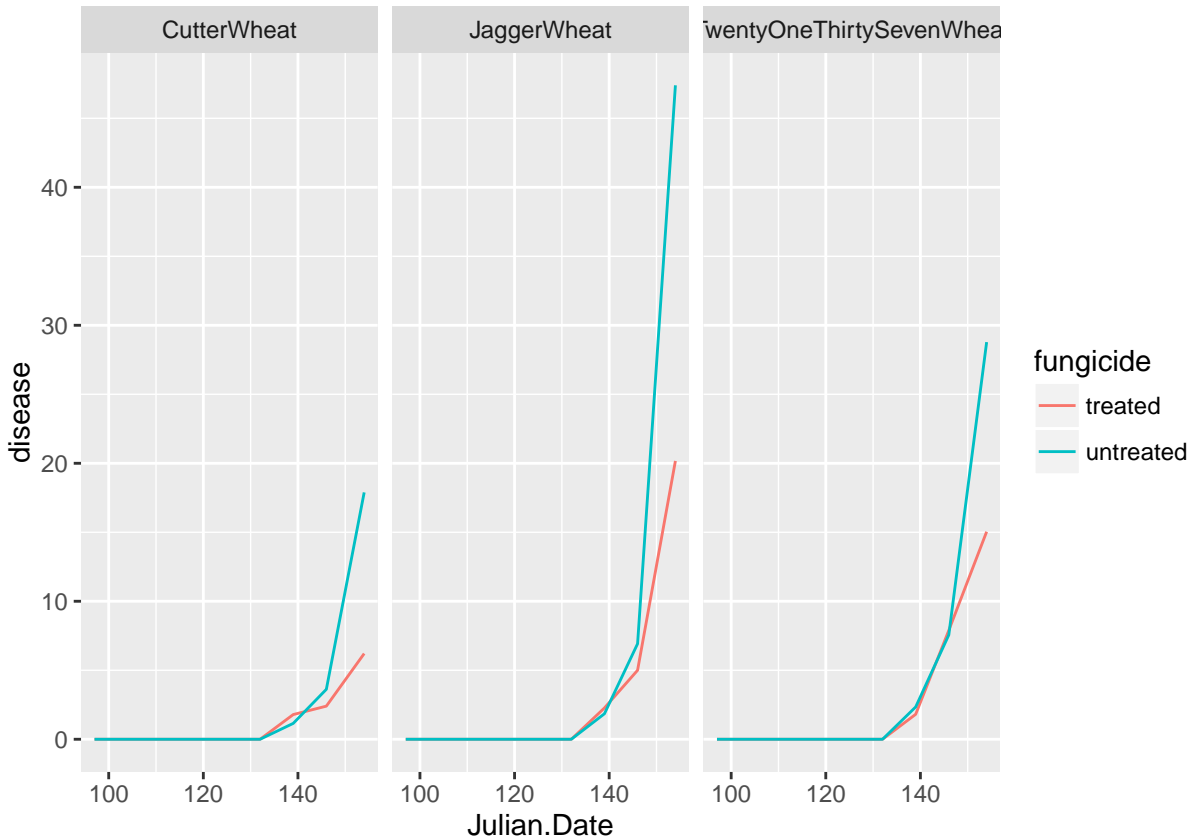
Lets see what the data set looks like after reformatting:

```
head(long_data)
```

##	Julian.Date	variable	disease	fungicide
## 1	97	TwentyOneThirtySevenWheat	0	untreated
## 2	104	TwentyOneThirtySevenWheat	0	untreated
## 3	111	TwentyOneThirtySevenWheat	0	untreated
## 4	118	TwentyOneThirtySevenWheat	0	untreated
## 5	125	TwentyOneThirtySevenWheat	0	untreated
## 6	132	TwentyOneThirtySevenWheat	0	untreated

## Graph AUDPC

```
library('ggplot2')
ggplot(long_data) +
  geom_line(aes(x = Julian.Date, y = disease, color = fungicide)) +
  facet_wrap(~variable)
```



## Conclusions

In general, the AUDPC only changes between the fungicide treatments during the last 10 days of the experiment. The “Cutter” seemed to be most resistant to the disease followed by “2137” and “Jagger”.