### 3. Fitting additional models using DI()

#### Fitting more flexible models using DI() function

##### Adding interaction of treatment with each species ID effect

# Most parameters are same as autoDI  
mod1 <- DI(y = "yield", prop = c("p1", "p2", "p3", "p4"),  
 data = model\_data, FG = c("G", "G", "L", "L"),  
 # We now need to specify the interaction structure to fit  
 DImodel = "FG",   
 # Specify any additional terms/interactions here  
 # We add an interaction of treatment with each species  
 extra\_formula = ~ (p1 + p2 + p3 + p4):treatF)  
  
summary(mod1)

##### Adding interaction of treatment with each interaction

# Interaction of treatment with the FG interaction terms  
mod2 <- DI(y = "yield", prop = c("p1", "p2", "p3", "p4"),  
 DImodel = "FG", FG = c("G", "G", "L", "L"),  
 extra\_formula = ~ (FG\_):treatF, data = model\_data)  
  
summary(mod2)

##### Adding interaction of treatment with both, species ID and interaction effects

# Adding an interaction term of treatment with everything in the model  
mod3 <- DI(y = "yield", prop = c("p1", "p2", "p3", "p4"),  
 DImodel = "FG", FG = c("G", "G", "L", "L"),  
 extra\_formula = ~ (p1 + p2 + p3 + p4 + FG\_):treatF,   
 data = model\_data)  
  
summary(mod3)

###### Adding specific interaction terms

# We will add interaction terms with specific identity and interaction terms # For that we need to add the interaction terms to the data first  
  
# The DI\_data can be used to accomplish this  
# Same parameters as autoDI and DI functions  
FG\_ints <- DI\_data(prop = c("p1", "p2", "p3", "p4"),  
 FG = c("G", "G", "L", "L"),  
 data = model\_data,  
 # what is used to specify desired interaction structure  
 what = "FG")  
  
# Add these interactions to the model\_data  
model\_data <- bind\_cols(model\_data, FG\_ints)  
  
# We add interaction of treatment with p1, p2 and the between FG interaction  
mod4 <- DI(y = "yield", prop = c("p1", "p2", "p3", "p4"),  
 DImodel = "FG", FG = c("G", "G", "L", "L"),  
 extra\_formula = ~ (p1 + p2 + bfg\_G\_L):treatF,   
 data = model\_data)  
  
summary(mod4)