Supplemental Appendix in support of PAPER TITLE

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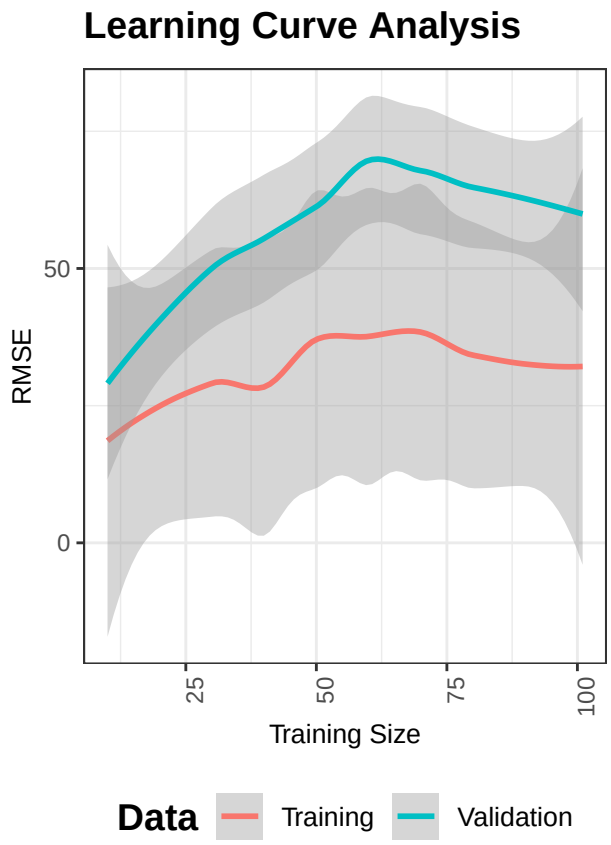
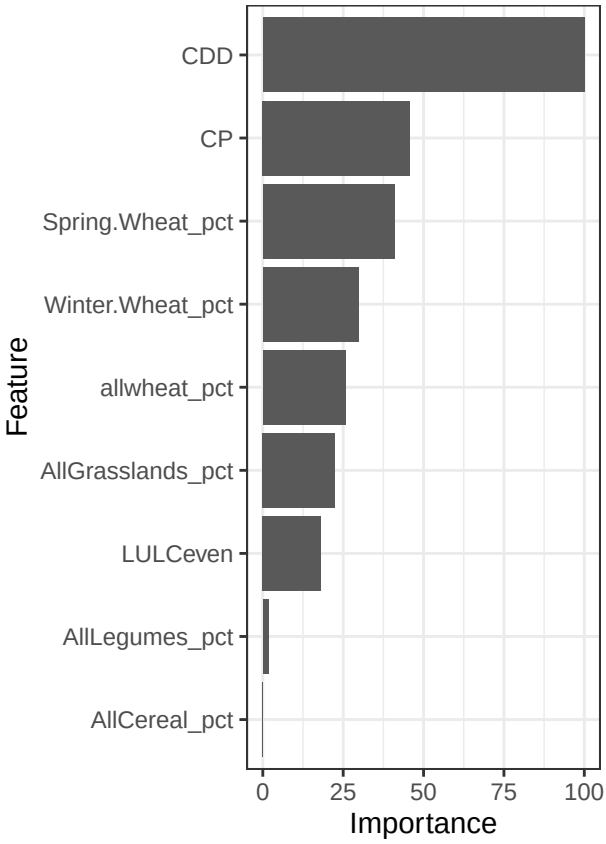
Contents

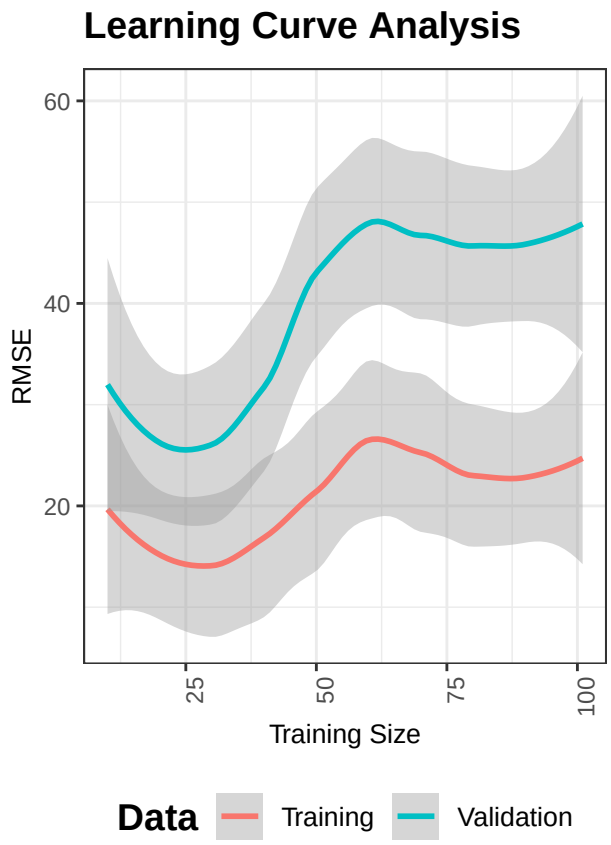
Total Aphids Model

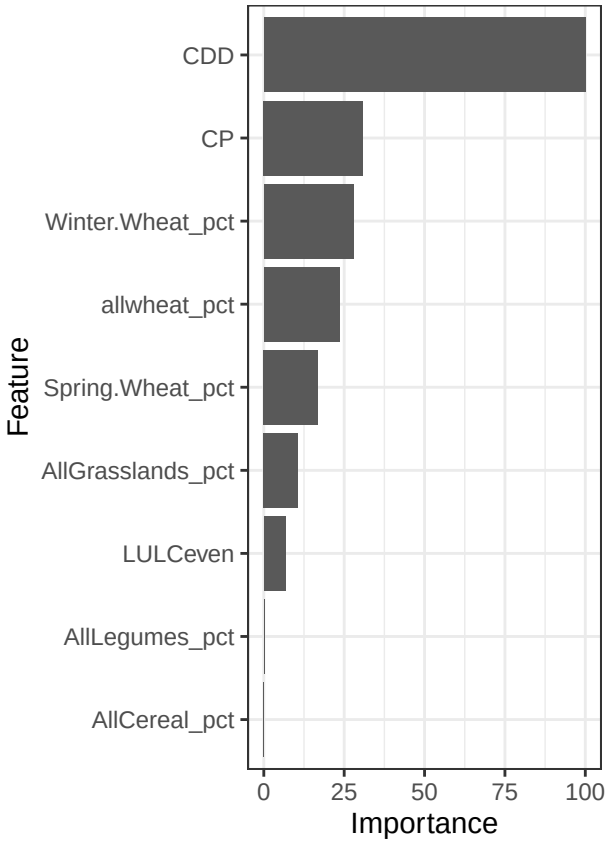





```
## Random Forest
##
## 101 samples
##   9 predictors
##
## No pre-processing
## Resampling: Cross-Validated (10 fold, repeated 1 times)
## Summary of sample sizes: 89, 90, 92, 91, 91, 90, ...
## Resampling results across tuning parameters:
##
##   mtry  RMSE      Rsquared   MAE
##   2     64.78268  0.1569018  48.76875
##   5     67.57931  0.1608612  50.15996
##   9     68.57751  0.1598344  49.98162
##
## RMSE was used to select the optimal model using the smallest value.
## The final value used for the model was mtry = 2.
```

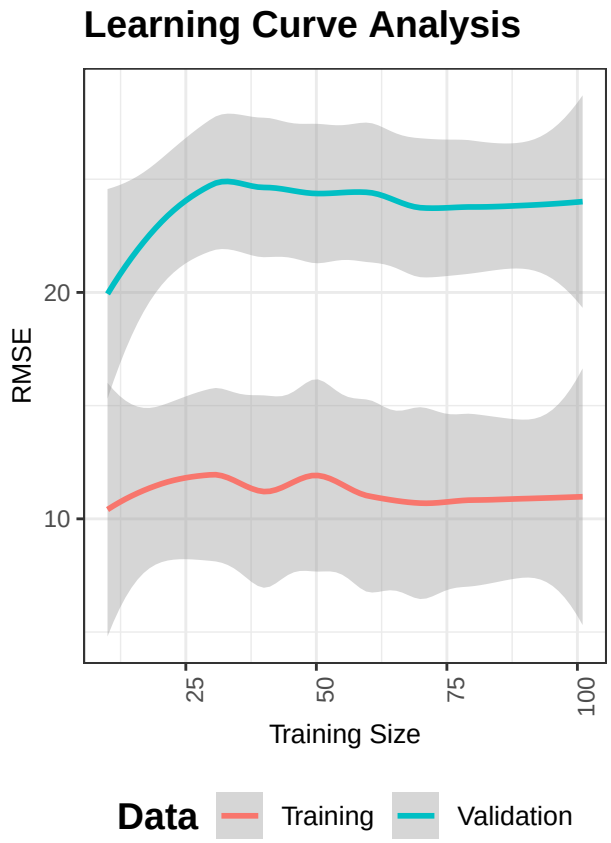
Total Aphids No Mfc Model

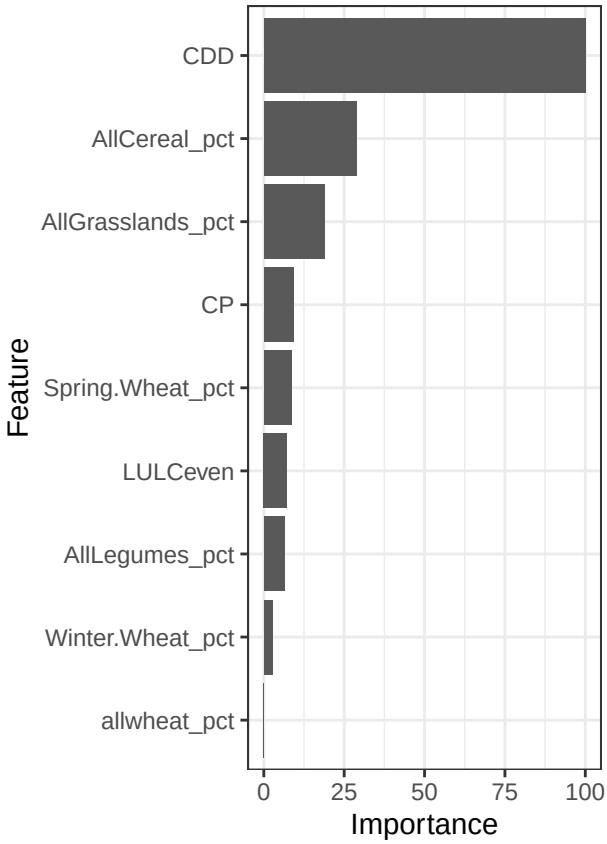





```
## Random Forest
##
## 101 samples
##   9 predictors
##
## No pre-processing
## Resampling: Cross-Validated (10 fold, repeated 1 times)
## Summary of sample sizes: 89, 90, 92, 91, 91, 90, ...
## Resampling results across tuning parameters:
##
##   mtry  RMSE      Rsquared   MAE
##   2     48.75631  0.2699527  36.01342
##   5     49.21273  0.2534876  35.60269
##   9     49.64269  0.2447464  35.43093
##
## RMSE was used to select the optimal model using the smallest value.
## The final value used for the model was mtry = 2.
```

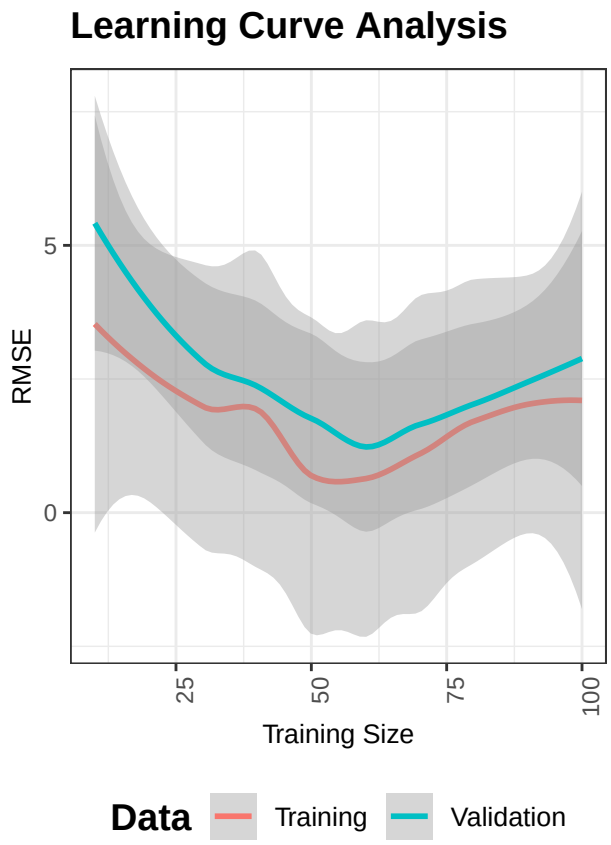
Relative Abundance Mfc Model

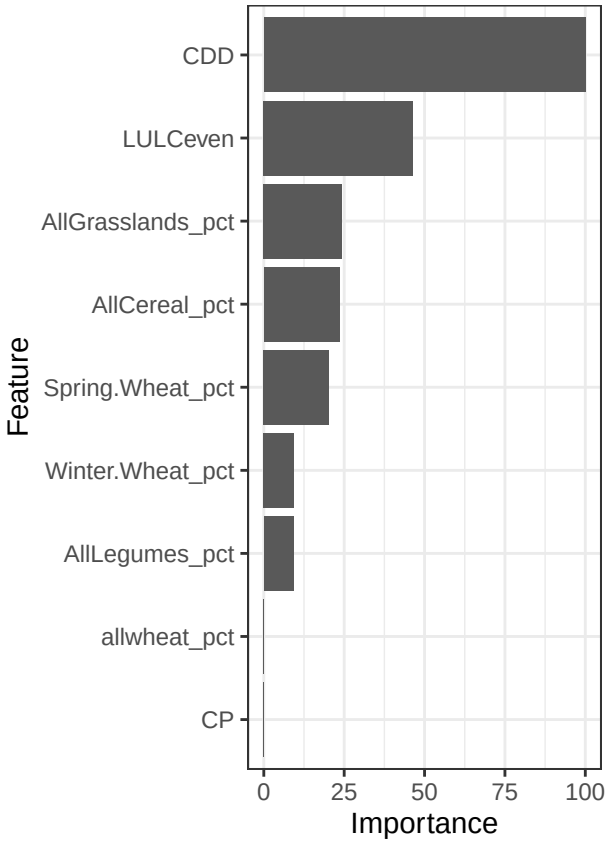





```
## Random Forest
##
## 101 samples
##   9 predictors
##
## No pre-processing
## Resampling: Cross-Validated (10 fold, repeated 1 times)
## Summary of sample sizes: 89, 90, 92, 91, 91, 90, ...
## Resampling results across tuning parameters:
##
##   mtry  RMSE      Rsquared   MAE
##   2     24.04913  0.2080817  20.31317
##   5     24.37890  0.2457944  20.53565
##   9     25.11418  0.2213461  21.11501
##
## RMSE was used to select the optimal model using the smallest value.
## The final value used for the model was mtry = 2.
```

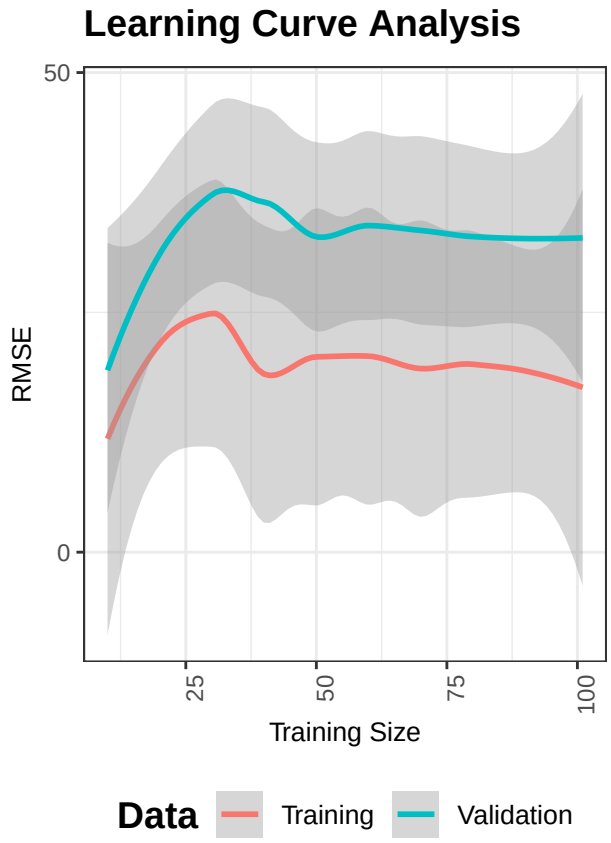
Individual Aphids: Rp

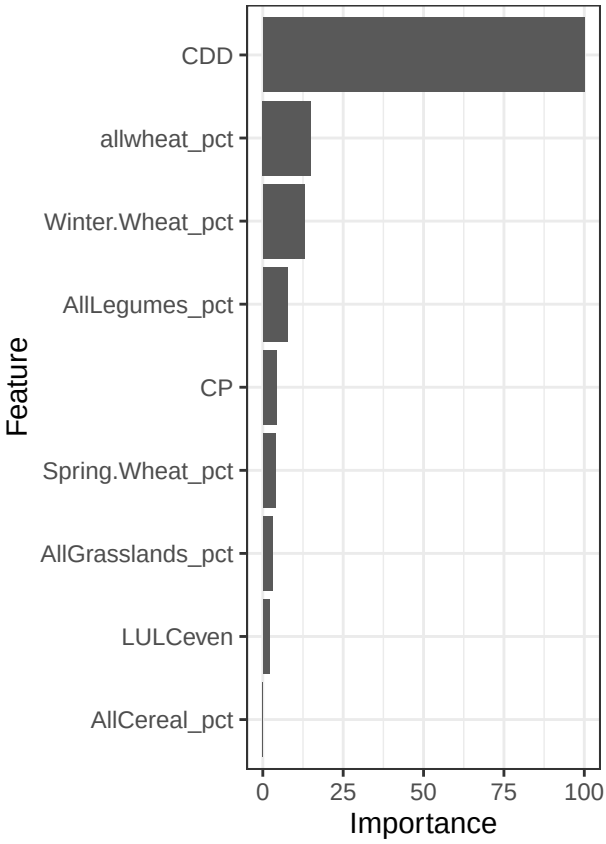





```
## Random Forest
##
## 100 samples
##   9 predictors
##
## No pre-processing
## Resampling: Cross-Validated (10 fold, repeated 1 times)
## Summary of sample sizes: 89, 91, 90, 89, 91, 90, ...
## Resampling results across tuning parameters:
##
##   mtry  RMSE      Rsquared    MAE
##   2     2.501708  0.08506083  1.610710
##   5     2.529702  0.10604945  1.573597
##   9     2.711837  0.17160733  1.617458
##
## RMSE was used to select the optimal model using the smallest value.
## The final value used for the model was mtry = 2.
```

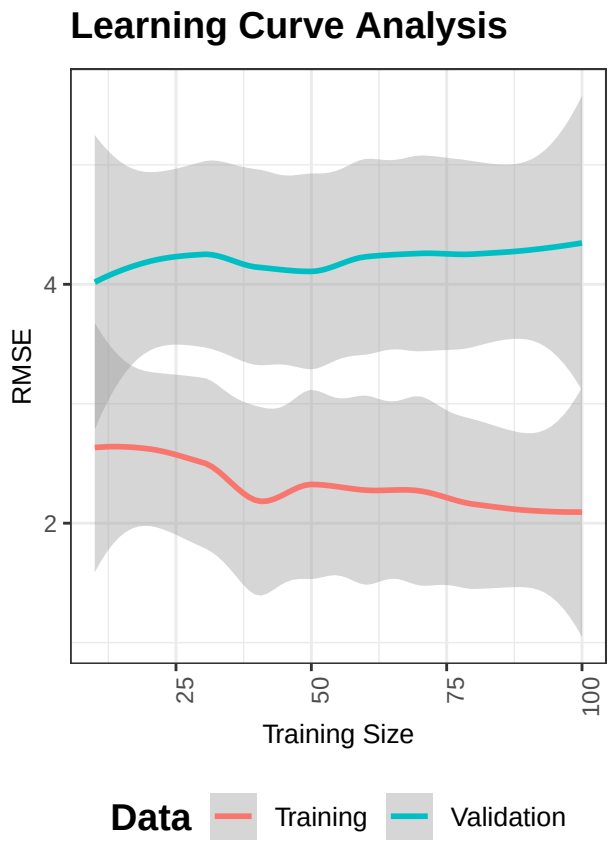
Individual Aphids: Sa

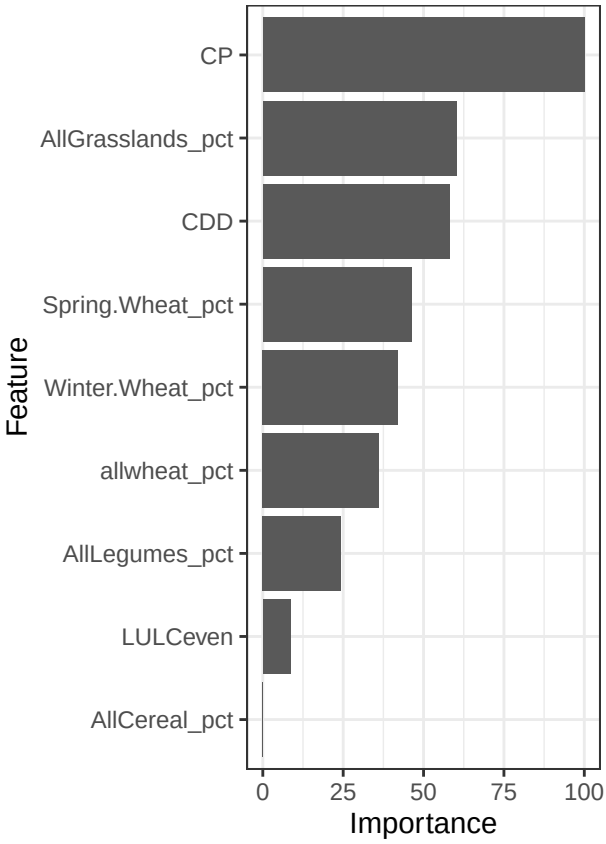





```
## Random Forest
##
## 101 samples
##   9 predictors
##
## No pre-processing
## Resampling: Cross-Validated (10 fold, repeated 1 times)
## Summary of sample sizes: 89, 90, 92, 91, 91, 90, ...
## Resampling results across tuning parameters:
##
##   mtry  RMSE      Rsquared   MAE
##   2     32.31825  0.4945743  21.97183
##   5     31.49266  0.5162830  21.30232
##   9     32.89967  0.5052096  21.91088
##
## RMSE was used to select the optimal model using the smallest value.
## The final value used for the model was mtry = 5.
```

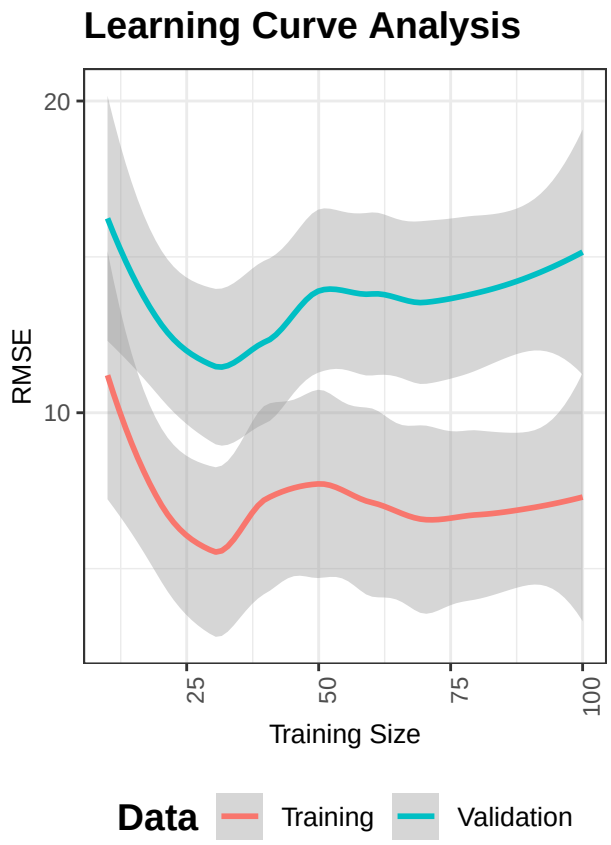
Individual Aphids: Md

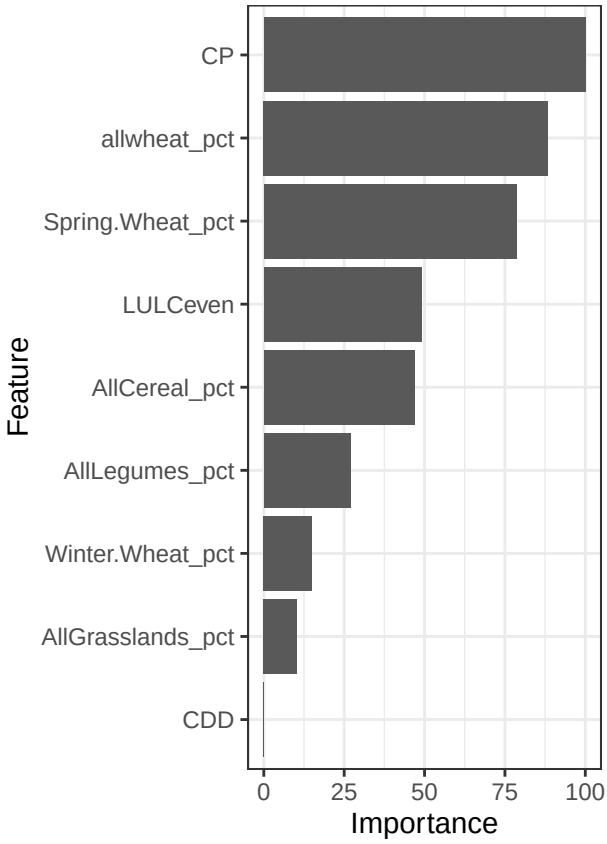




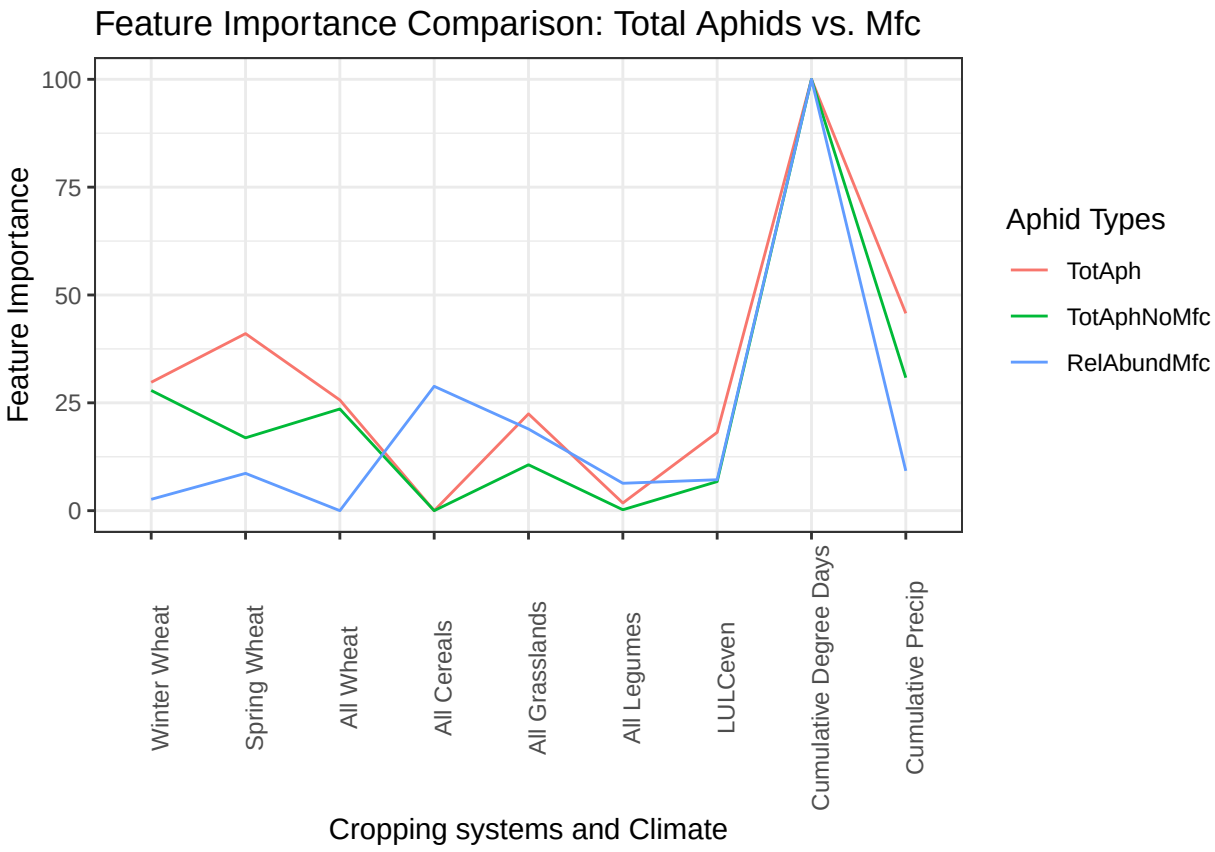

```
## Random Forest
##
## 100 samples
##   9 predictors
##
## No pre-processing
## Resampling: Cross-Validated (10 fold, repeated 1 times)
## Summary of sample sizes: 90, 89, 89, 89, 91, 90, ...
## Resampling results across tuning parameters:
##
##   mtry  RMSE      Rsquared   MAE
##   2     4.337734  0.2476065  3.381242
##   5     4.391711  0.2258709  3.449717
##   9     4.434257  0.2141594  3.506636
##
## RMSE was used to select the optimal model using the smallest value.
## The final value used for the model was mtry = 2.
```

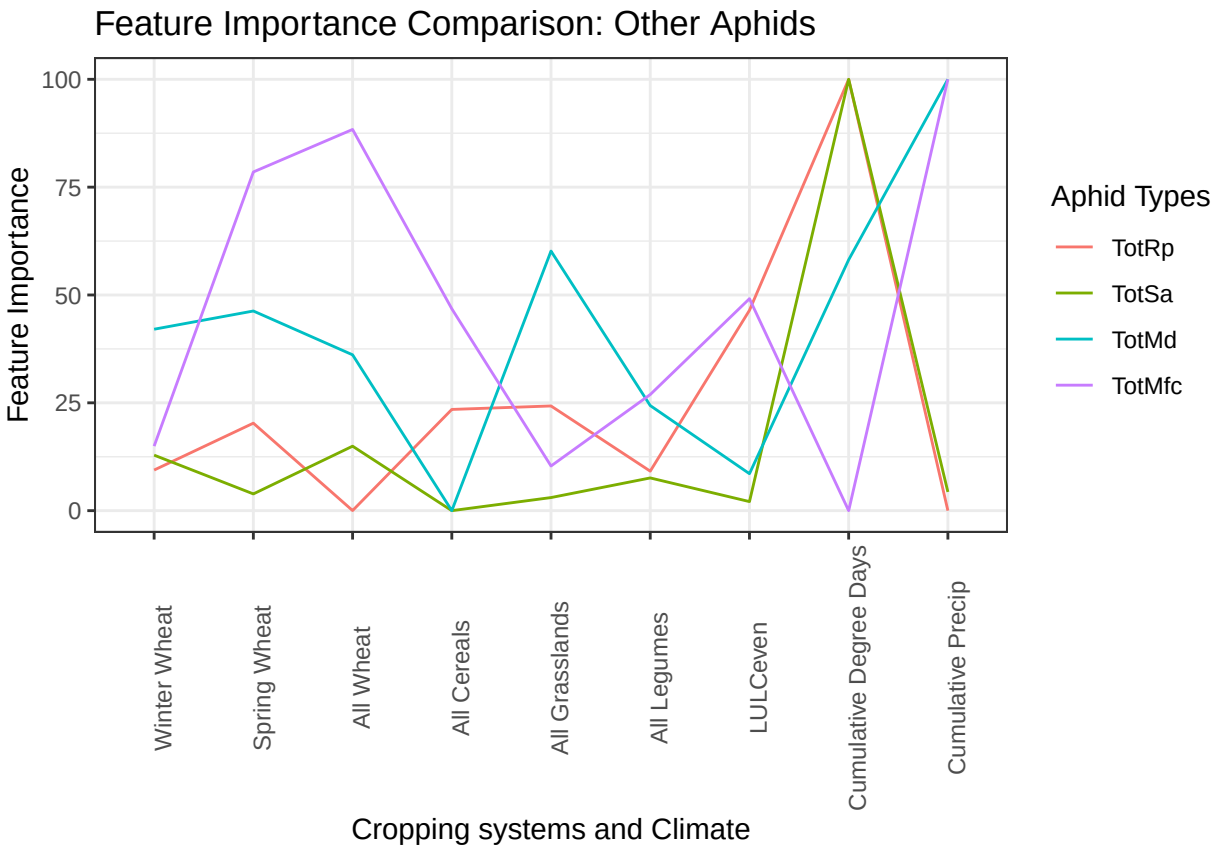
Individual Aphids: Mfc

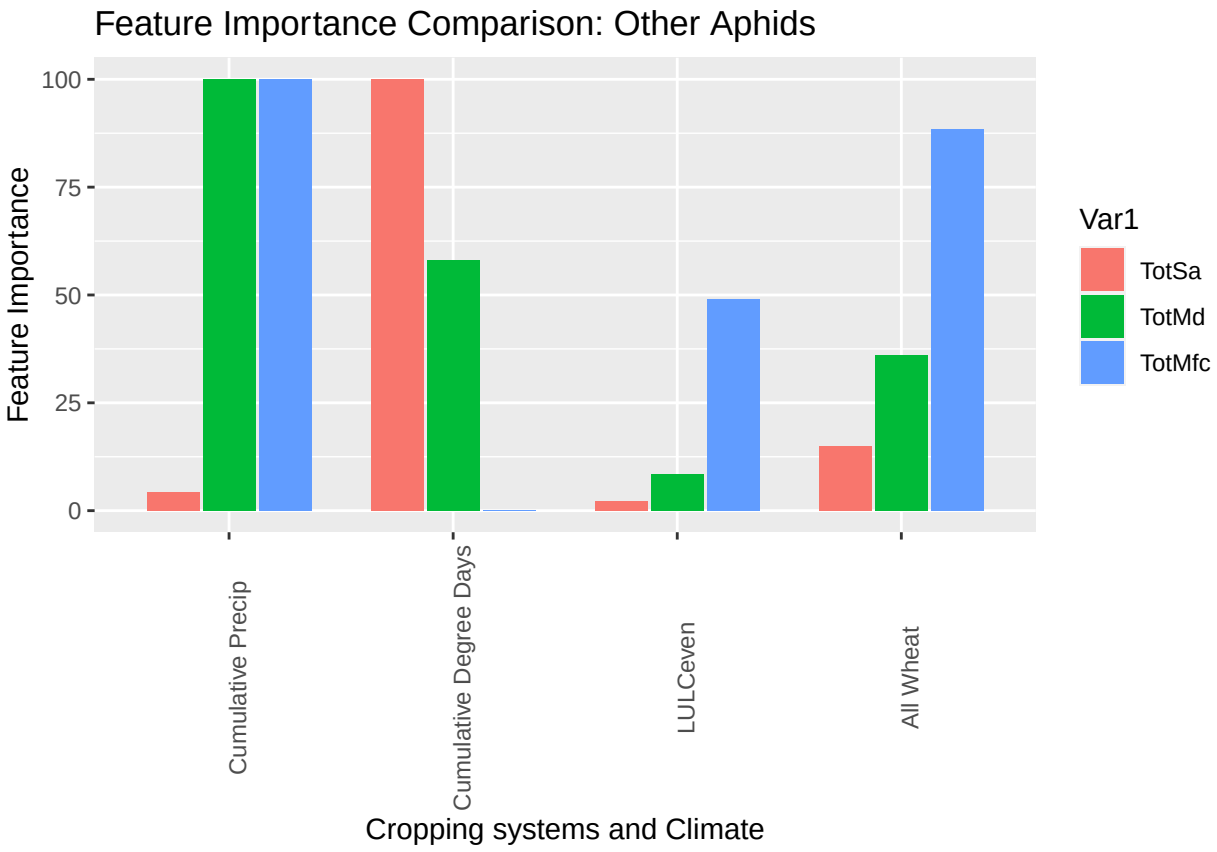





```
## Random Forest
##
## 100 samples
##   9 predictors
##
## No pre-processing
## Resampling: Cross-Validated (10 fold, repeated 1 times)
## Summary of sample sizes: 90, 89, 89, 90, 90, 91, ...
## Resampling results across tuning parameters:
##
##   mtry  RMSE      Rsquared   MAE
##   2     14.85645  0.1558217  11.95953
##   5     15.29274  0.1427161  12.43366
##   9     15.46483  0.1482640  12.59967
##
## RMSE was used to select the optimal model using the smallest value.
## The final value used for the model was mtry = 2.
```


Feature Importance Comparison: Total Aphids vs. Mfc
Feature Importance
100
75
50
25
0
Winter Wheat
Spring Wheat
All Wheat
All Cereals
All Grasslands
All Legumes
LULCeven
Cumulative Degree Days
Cumulative Precip
Cropping systems and Climate
Aphid Types
TotAph
TotAphNoMfc
RelAbundMfc


Feature Importance Comparison: Other Aphids
Feature Importance
100
75
50
25
0
Winter Wheat
Spring Wheat
All Wheat
All Cereals
All Grasslands
All Legumes
LULCeven
Cumulative Degree Days
Cumulative Precip
Cropping systems and Climate
Aphid Types
TotRp
TotSa
TotMd
TotMfc


Feature Importance Comparison: Other Aphids
Feature Importance
100
75
50
25
0
Cumulative Precip
Cumulative Degree Days
LULCeven
All Wheat
Cropping systems and Climate
Var1
TotSa
TotMd
TotMfc


Biotic Collection Sites by Agroecological Zone
Agroecozone
4
3
2
1
8
53
38
42
0
20
40
Number of Aphid Collection Sites