

Supplementary information

Table S1. Dates of the main phenological phases by growing season. DAE: days after emergence.

	Date (DAE)				
	2017	2018	2019	2020	2021
Planting	22 Apr	15 May	16 May	26 May	22 May
Emerging	16 May (1)	1 Jun (1)	4 Jun (1)	10 Jun (1)	10 Jun (1)
Flowering	13 Jun (29)	4 Jul (34)	13 Jul (40)	13 Jul (34)	14 Jul (35)
Start of senescence	19 Jul (65)	15 Aug (76)	17 Aug (75)	14 Aug (66)	7 Aug (59)
End of senescence	12 Aug (89)	14 Sept (106)	1 Sept (90)	31 Aug (83)	26 Aug (78)

Table S2. Total *Alternaria* conidia by growing season and distribution of conidia in percentage during the main phenological phases.

	2017	2018	2019	2020	2021
Total <i>Alternaria</i> conidia	7873	9264	6399	2476	6444
<i>Alternaria</i> conidia (%)					
Vegetative stage	37	22	21	16	54
Flowering stage	45	49	68	32	25
Senescence stage	18	29	11	52	21

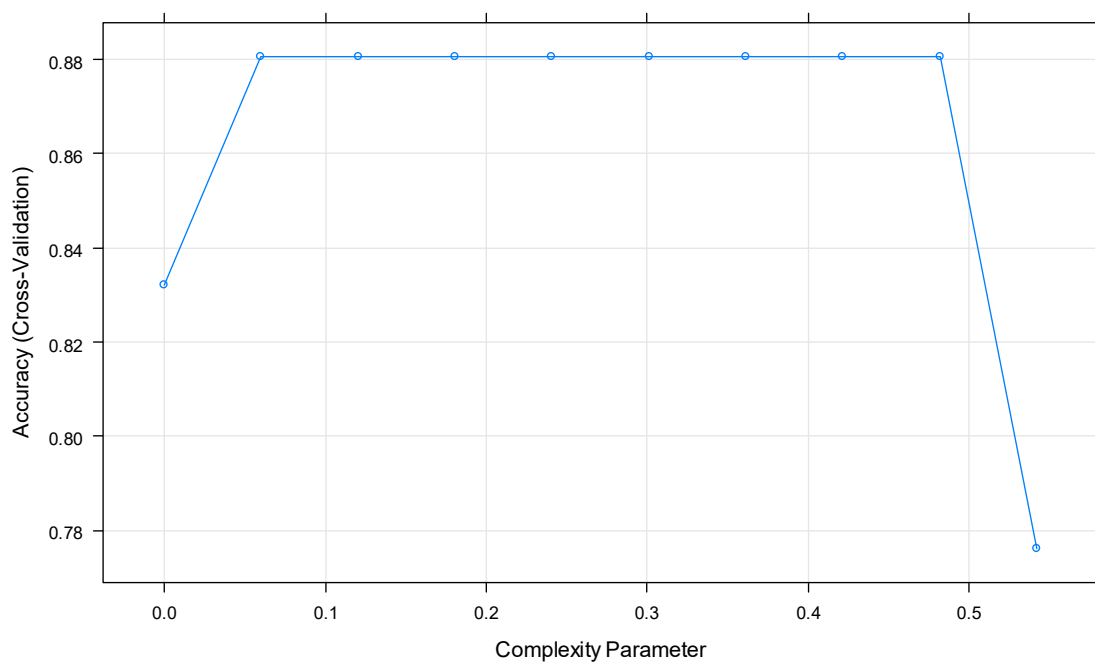


Figure S1. Cross-validation to test a range of complexity parameters for the classification and regression tree (CART) model without *Alternaria conidia*.

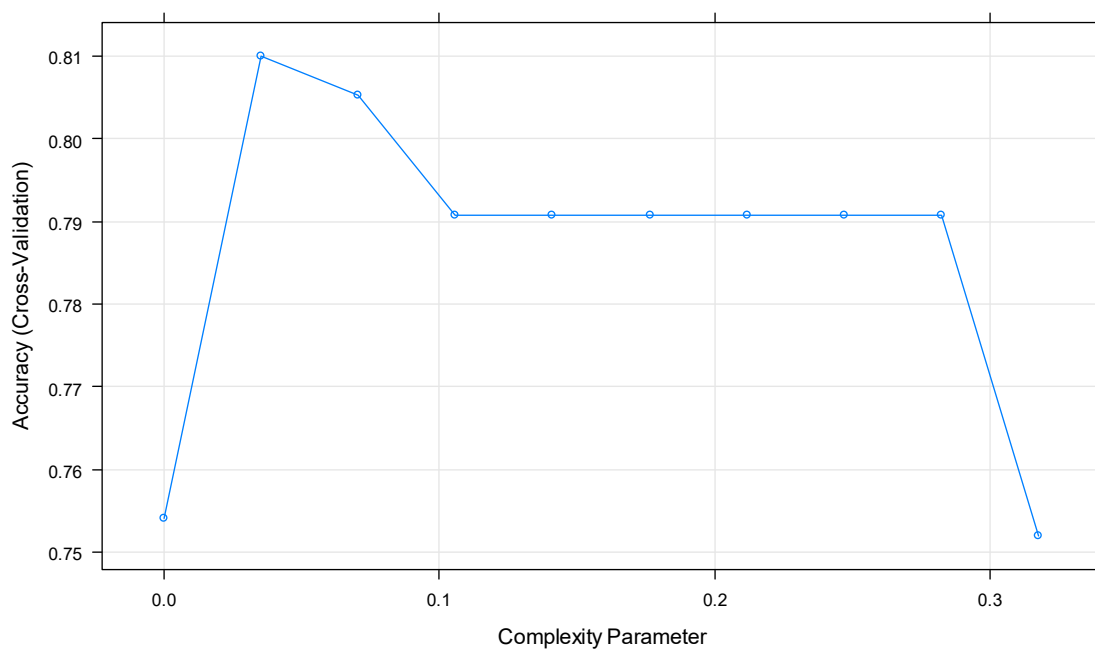


Figure S2. Cross-validation to test a range of complexity parameters for the classification and regression tree (CART) model with *Alternaria conidia*.

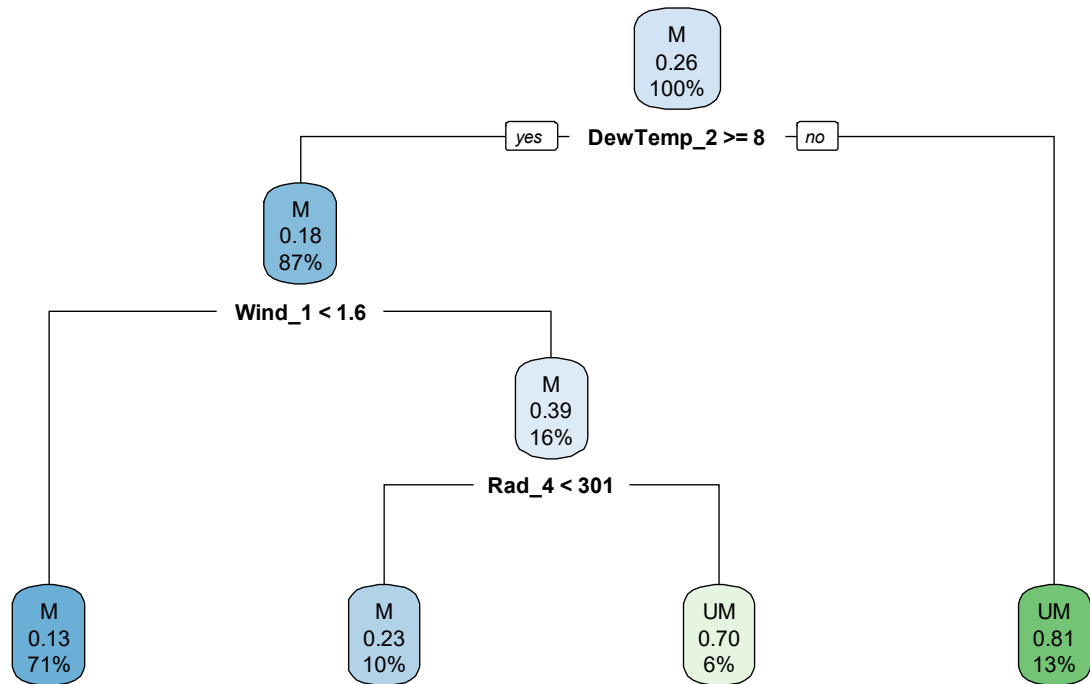


Figure S3. A decision tree based on the classification and regression tree (CART) model with the data set without *Alternaria* conidia. UM and M represents meaningful (<10 conidia/m³) and meaningful (≥ 10 conidia/m³). The weather variables Wind_1, DewTemp_2, and Rad_4, represent wind (on 1 previous day), dew temperature (2 previous days), and solar radiation (4 previous days), respectively.

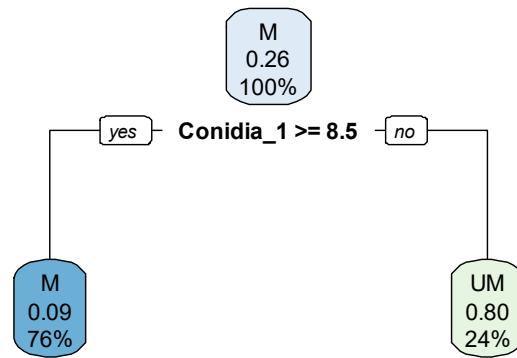


Figure S4. A decision tree based on the classification and regression tree (CART) model with the data set with *Alternaria* conidia. UM and M represent meaningful (<10 conidia/m³) and meaningful (≥ 10 conidia/m³). The weather variable conidia_1, represent conidia in the immediate past day.

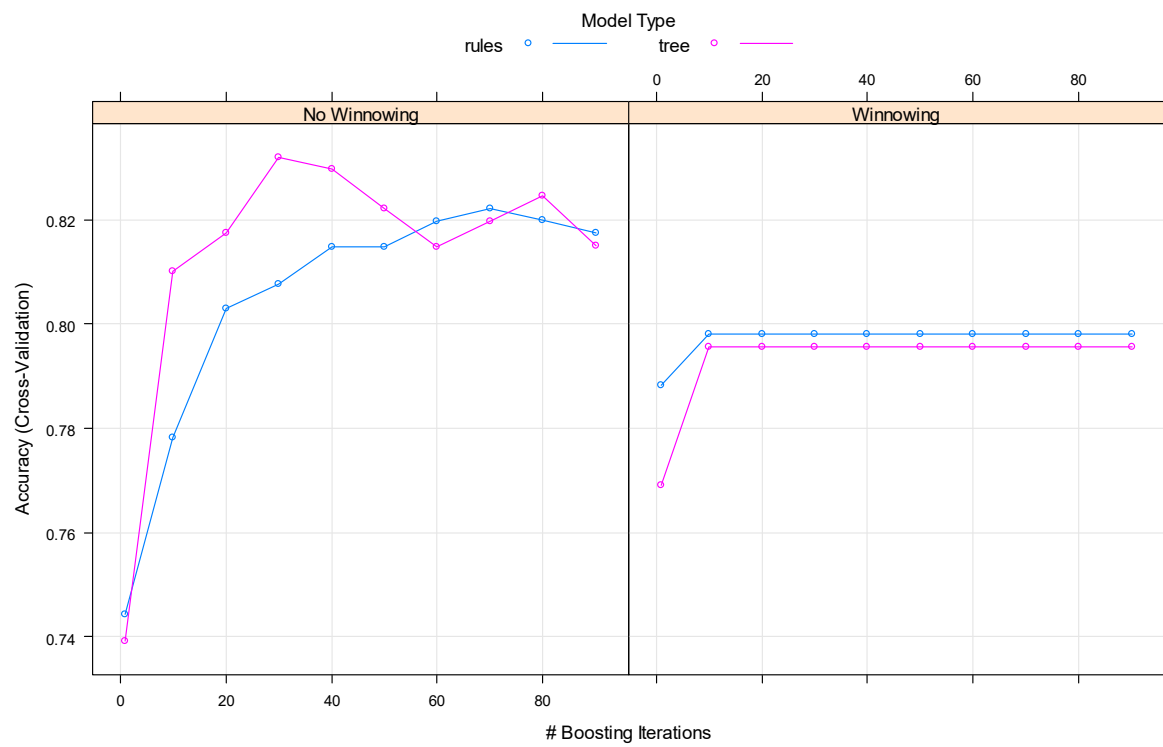


Figure S5. Cross-validation for the selection of the best model for the C5.0 decision tree model with the data set without *Alternaria* conidia.

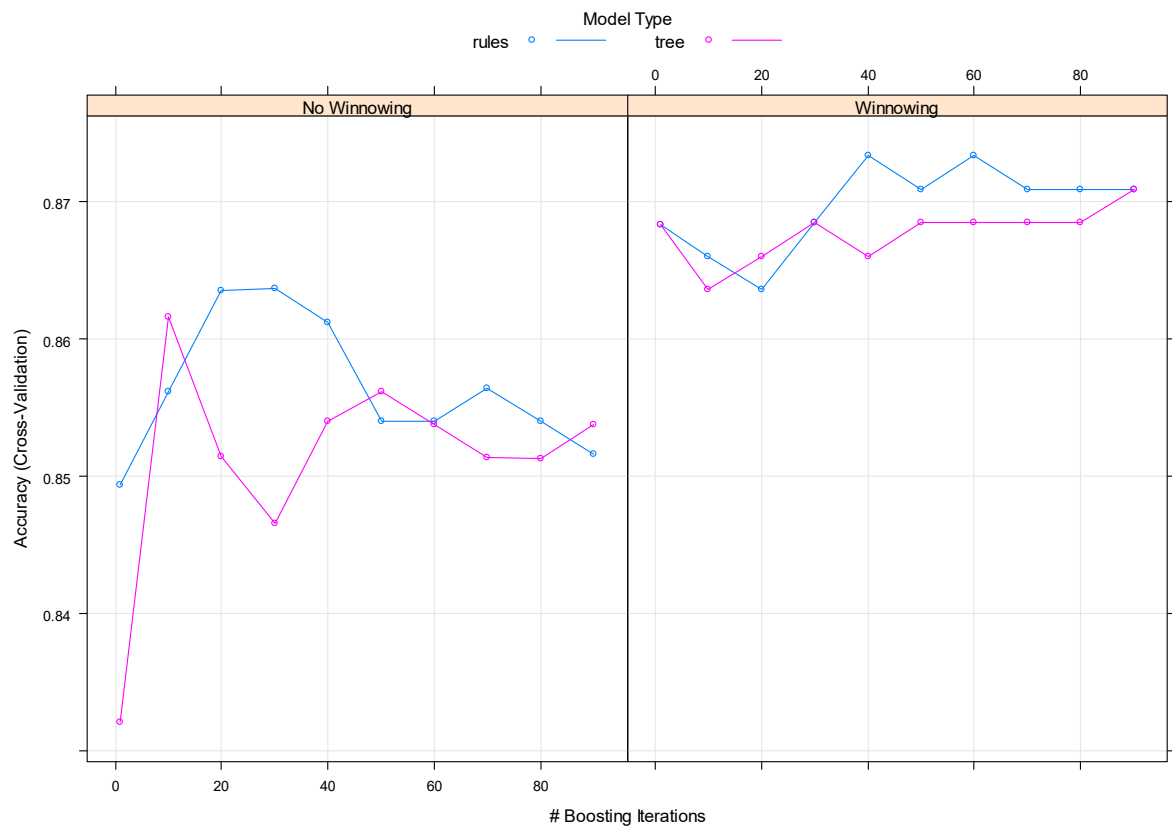


Figure S6. Cross-validation for the selection of the best model for the C5.0 decision tree model with the data set with *Alternaria conidia*.

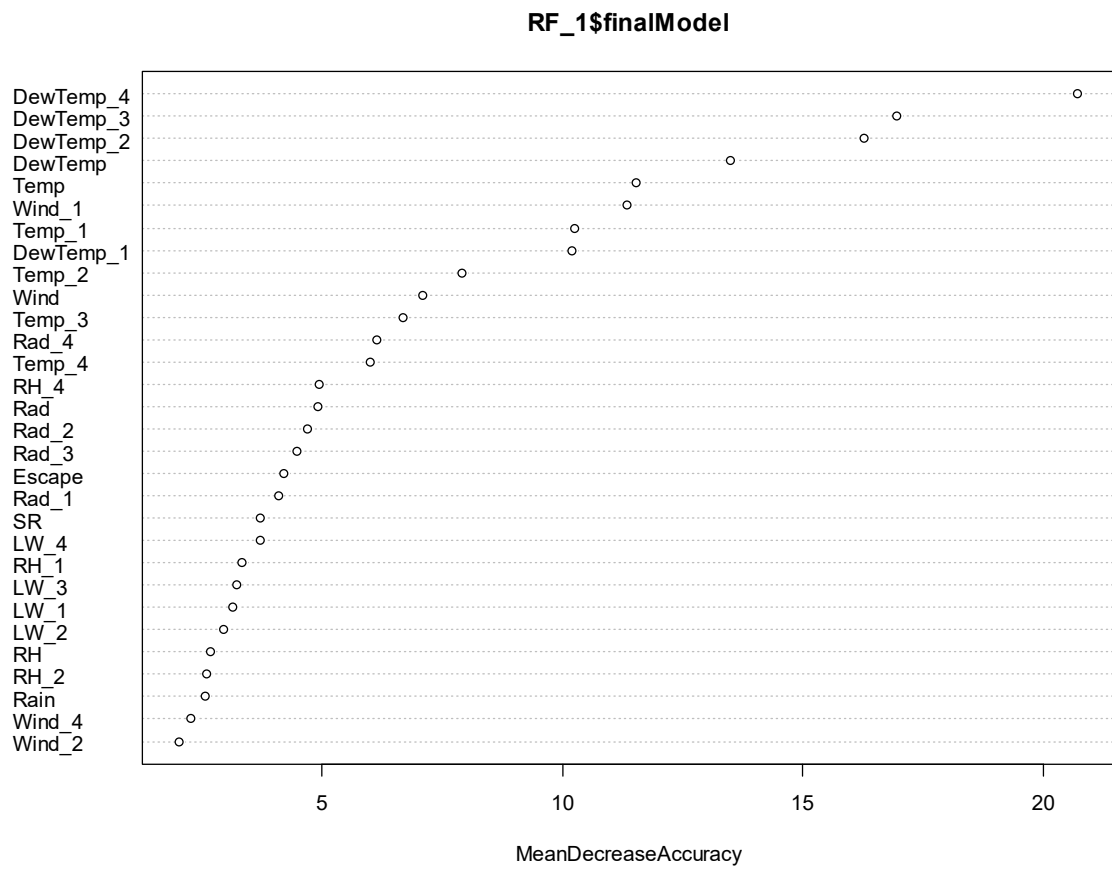


Figure S7. The variable of importance from the random forest model with the data set that did not include *Alternaria* conidia.

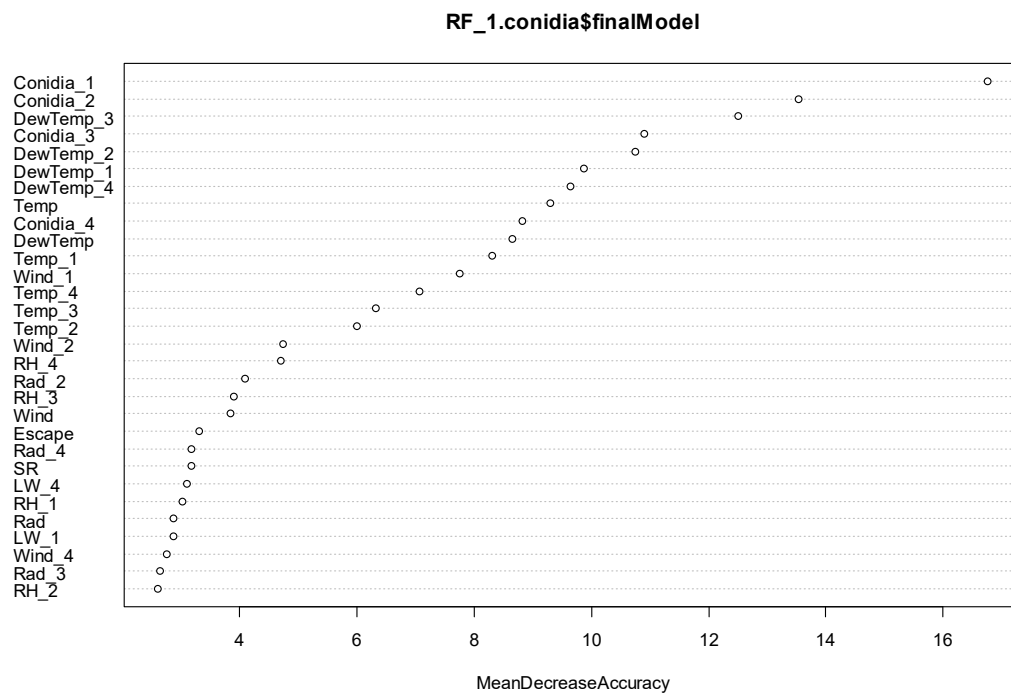


Figure S8. The variable of importance from the random forest model with the data set that included *Alternaria* conidia.

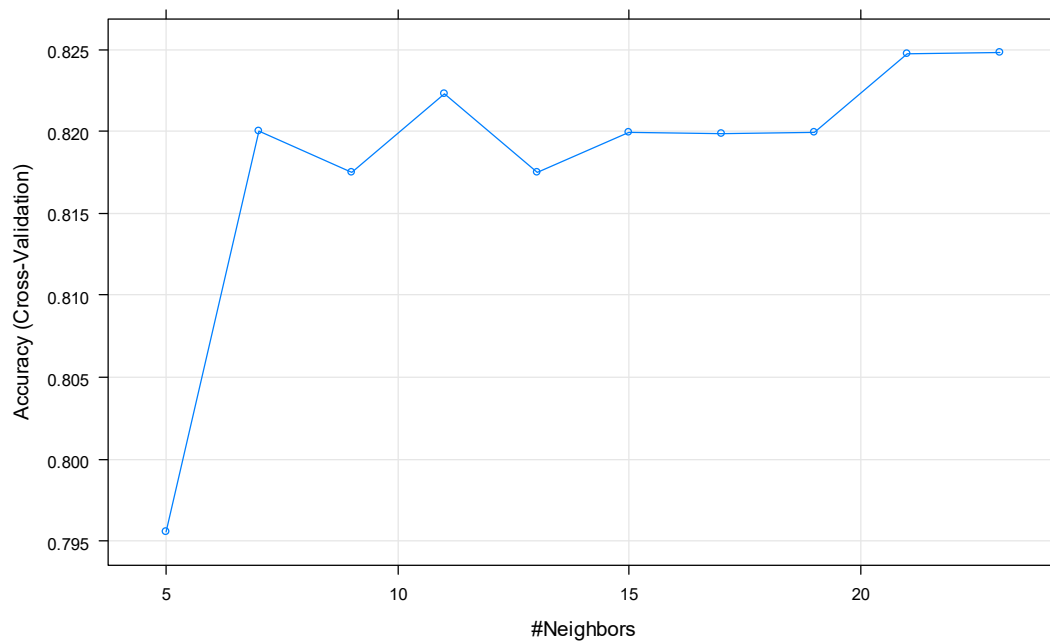


Figure S9. Cross-validation to select the optimal number of neighbors in the K-nearest neighbor (KNN) algorithm. The data used here did not include *Alternaria* conidia.

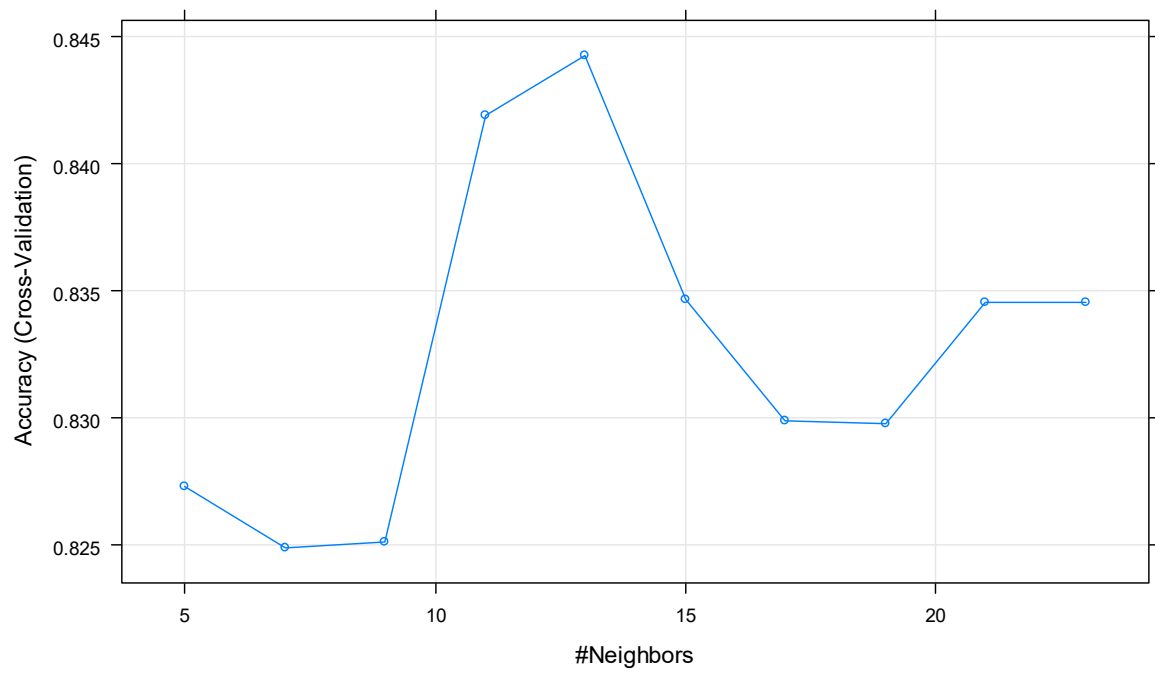


Figure S10. Cross-validation to select the optimal number of neighbors in the K-nearest neighbor (KNN) algorithm. The data used here included *Alternaria* conidia.