

Supplementary Table S1. Results of the different machine learning approaches for disease detection of symptomatic and asymptomatic greenhouse plants. Best machine learning approaches were chosen according to their classification accuracy (highlighted in bold).

			Classification Accuracy (%)		True Positive Rate (%)		False Positive Rate (%)	
			VNIR	SWIR	VNIR	SWIR	VNIR	SWIR
Symptomatic	Aligote (GLRaV-3)	LDA	81	91	79	86	17	5
		PLS	81	91	79	87	17	4
		MLP	85	89	85	87	12	9
		rRBF	83	91	82	87	16	4
	Gewürztraminer (GLRaV-1)	LDA	75	86	71	86	21	15
		PLS	75	86	74	85	24	14
		MLP	78	83	77	84	21	18
		rRBF	77	87	75	91	21	14
	Silvaner (GLRaV-1)	LDA	70	81	68	81	28	18
		PLS	70	82	68	81	28	18
		MLP	73	79	74	77	29	19
		rRBF	71	83	68	83	27	16
	Pinot Noir (GLRaV-1)	LDA	70	84	56	82	16	14
		PLS	72	84	58	82	14	14
		MLP	80	83	75	81	16	15
		rRBF	74	84	66	83	17	14
Asymptomatic	Aligote (GLRaV-3)	LDA	84	89	83	89	16	11
		PLS	85	89	87	89	16	11
		MLP	91	89	92	89	9	11
		rRBF	87	93	87	94	13	8
	Pinot Noir (GLRaV-1)	LDA	64	70	64	69	37	29
		PLS	64	70	62	72	35	31
		MLP	73	68	72	66	26	30
		rRBF	66	75	64	78	32	26

LDA = Linear Discriminance Model, PLS = Partially Least Square, MLP = Multi-Layer Perceptron Network, rRBF = Radial-Basis Function Network.

Supplementary Table S2. Results of the different machine learning approaches for in-field disease detection of symptomatic white/red and asymptomatic plants. Best machine learning approaches were chosen according to their classification accuracy (highlighted in bold).

			Classification Accuracy (%)						True Positive Rate (%)						False Positive Rate (%)					
			VNIR			SWIR			VNIR			SWIR			VNIR			SWIR		
			2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018
GLRaV-1	Symptomatic White	LDA	F	62	75	54	68	79	F	56	78	65	67	77	F	33	28	57	31	18
		PLS	71	63	76	76	69	78	70	56	76	77	68	77	27	31	24	24	30	20
		MLP	77	65	80	76	70	77	78	60	80	76	73	76	24	31	20	24	33	23
		rRBF	74	63	80	78	72	80	73	58	75	86	72	79	26	32	23	21	28	20
	Symptomatic Red	LDA	F	81	93	52	87	85	F	72	91	63	89	84	F	9	5	59	16	13
		PLS	83	83	93	77	87	85	85	76	92	74	90	85	19	10	5	21	16	16
		MLP	90	88	96	76	91	83	92	89	97	75	94	82	11	12	5	23	8	15
		rRBF	85	86	95	81	94	87	87	82	95	85	95	90	16	11	5	20	14	16
	Asymptomatic	LDA	F	61	66	53	67	75	F	63	68	63	69	77	F	42	35	57	35	27
		PLS	60	61	65	67	68	75	61	64	62	66	70	77	41	43	31	31	31	27
		MLP	63	62	70	67	74	73	64	66	72	67	80	74	37	41	31	32	38	28
		rRBF	62	62	69	69	66	76	62	64	73	72	69	84	38	41	37	30	36	26
GLRaV-3	Symptomatic White	LDA	F	60	67	58	80	73	F	55	62	68	78	68	F	34	28	52	18	23
		PLS	87	63	67	88	80	73	91	60	65	88	78	70	17	35	30	11	17	24
		MLP	92	69	74	86	86	71	94	68	71	85	90	68	10	31	26	13	17	25
		rRBF	88	66	68	89	88	74	91	66	66	94	88	75	15	34	30	10	15	24
	Symptomatic Red	LDA	F	68	-	52	88	-	F	67	-	61	95	-	F	31	-	57	19	-
		PLS	83	71	-	90	88	-	87	72	-	95	95	-	22	30	-	14	19	-
		MLP	94	82	-	90	95	-	96	82	-	93	96	-	7	18	-	13	6	-
		rRBF	88	75	-	94	92	-	92	77	-	92	98	-	16	26	-	8	15	-
	Asymptomatic	LDA	F	62	63	50	65	62	F	58	58	39	64	61	F	34	32	39	35	36
		PLS	74	62	63	72	64	62	80	58	58	76	63	59	33	33	31	33	35	35
		MLP	81	65	65	71	76	62	84	65	62	73	79	60	23	36	32	24	26	36
		rRBF	73	63	65	80	73	63	76	61	59	83	74	62	30	34	28	30	27	36

LDA = Linear Discriminance Model, PLS = Partially Least Square, MLP = Multi-Layer Perceptron Network, rRBF = Radial-Basis Function Network, F = Model could not be developed due to numerical problems.

Supplementary Table S3. Results of the different machine learning approaches for in-field symptom and disease differentiation. Best machine learning approaches were chosen according to their classification accuracy (highlighted in bold).

			Classification Accuracy (%)						True Positive Rate (%)						False Positive Rate (%)					
			VNIR			SWIR			VNIR			VNIR			SWIR			VNIR		
			2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018
Symptom-based Differentiation	GLRaV-1	LDA	F	83	93	52	79	88	F	75	90	41	85	87	F	9	4	37	27	10
		PLS	82	84	93	71	80	88	81	76	90	73	87	87	17	9	3	31	26	10
		MLP	91	89	95	70	88	85	92	87	95	72	92	85	10	9	5	33	14	14
		rRBF	85	84	95	82	85	90	84	78	94	80	93	94	14	10	4	17	22	10
	GLRaV-3	LDA	F	69	-	54	97	-	F	65	-	45	99	-	F	28	-	37	5	-
		PLS	89	68	-	98	97	-	84	67	-	96	99	-	6	30	-	1	5	-
		MLP	99	81	-	97	99	-	99	81	-	96	99	-	2	18	-	1	2	-
		rRBF	95	74	-	99	99	-	93	73	-	100	99	-	3	24	-	0	2	-
Virus-based Differentiation	White	LDA	F	64	71	53	76	75	F	67	65	63	77	72	F	39	22	57	26	23
		PLS	86	67	73	84	76	75	90	66	69	90	78	72	19	32	23	21	25	22
		MLP	92	71	82	82	85	76	93	70	82	86	84	75	9	29	18	21	22	22
		rRBF	87	68	76	90	81	79	89	66	74	92	87	84	15	30	23	12	18	20
	Red	LDA	F	88	-	50	99	-	F	91	-	60	100	-	F	16	-	59	1	-
		PLS	82	89	-	92	99	-	83	93	-	98	100	-	20	15	-	11	1	-
		MLP	96	95	-	98	99	-	96	96	-	95	99	-	4	5	-	2	1	-
		rRBF	88	92	-	93	99	-	90	94	-	94	100	-	14	10	-	8	2	-

LDA = Linear Discriminance Model, PLS = Partially Least Square, MLP = Multi-Layer Perceptron Network, rRBF = Radial-Basis Function Network, F = Model could not be developed due to numerical problems.