

## Article

# The potential global climate suitability of Kiwifruit bacterial canker disease (*Pseudomonas syringae* pv. *actinidiae*, Psa) using three modelling approaches: CLIMEX, MaxEnt and Multi-Model Framework

**Table S1.** The geographic coordinates of locations of Psa. Some presence data such as Australian points are excluded as they are now known to be a different pathovar.

Species	x	y	Species	x	y	Species	x	y
psa	102.5	30.5	psa	108.41	30.97	psa	6.08	46.12
psa	103.59	30.95	psa	107.01	29.31	psa	8.01427	47.0002
psa	105.447	32.11	psa	112	28	psa	1	44.35
psa	105.886	32.107	psa	110.7	29.92	psa	5.22	45.28
psa	106.2503	31.9858	psa	111.56	25.19	psa	-0.33	47.28
psa	105.1483	28.124	psa	117	32	psa	-0.04	46.1
psa	104.55	31.774	psa	116.46	31.02	psa	1.3	43.45
psa	104.38	30.99	psa	106.48	26.93	psa	1.45	47.3
psa	103.044	30.126	psa	104.85	26.59	psa	5.36	44.88
psa	106.597	31.752	psa	119.93	33.45	psa	5.46	43.27
psa	107.147	31.927	psa	109.73	30.6	psa	1.42	45.46
psa	107.465	32.055	psa	138.11	34.78	psa	-0.37	48.18
psa	103.9462	28.8766	psa	139.43	35.31	psa	2	46
psa	103.3511	30.213	psa	135.2	34.22	psa	-8.12	41.11
psa	102.8957	32.0205	psa	140.07	35.36	psa	-8.3	40.57
psa	103.7956	31.13314	psa	141.56	43.36	psa	-8.38	42.01
psa	104.933	28.915	psa	139.35	35.51	psa	-8.24	41.37
psa	107.44	34.16	psa	139.25	35.22	psa	-8.39	41.08
psa	108.05	34.16	psa	141.347	43.064	psa	-8	39.5
psa	108.54	33.93	psa	139.75	35.68	psa	11.45	45.3
psa	107.63	34.44	psa	130.12	33.22	psa	15.39	38.06
psa	109	36	psa	127	34.45	psa	10.59	44.32
psa	109.01	33.9	psa	126.38	35.11	psa	12.06	42.25
psa	109.68	34.19	psa	126.36	33.23	psa	7.32	44.23
psa	107.11	33.14	psa	126.56	34.42	psa	8.25	45.19
psa	120.19	30.31	psa	127.03	37.58	psa	7.23	44.39
psa	118.82	28.81	psa	126.28	34.59	psa	8.12	44.54
psa	120.08	27.59	psa	127.29	34.56	psa	8.15	43.98
psa	121.5	29.36	psa	128.15	35.15	psa	13	46

psa	121.11	30.07	psa	20.7	39.55	psa	14.46	40.91
psa	120.5	30.62	psa	13.54	45.72	psa	12.8333	42.8333
psa	119.17	28.7	psa	15.167	46.25	psa	-8.38	42.25
psa	111.27	33.65	psa	14.3	45.39	psa	-7.51	42.45
psa	108.22	31.24	psa	40.21	40.91	psa	11.34	48.08
psa	9.45	54.12	psa	108.6	34.1	psa	7.62063	44.68735
psa	176.15	-37.8	psa	108.22	34.16	psa	7.551743	44.32911
psa	175.55	-37.33	psa	106.74	31.86	psa	7.486574	44.56565
psa	175.65	-38.21	psa	106.55	29.56	psa	7.411407	44.8747
psa	177.08	-38.1	psa	106.2642	26.21513	psa	7.324214	44.72528
psa	175.87	-37.46	psa	105.93	31.73	psa	5.283125	46.24749
psa	172.88	-41.05	psa	105.59	30.53	psa	1.52	44.08
psa	138	36	psa	104.67	31.46	psa	-0.29958	44.70022
psa	133.5	33.75	psa	104.0759	30.65165	psa	-0.3	45.9
psa	131	33	psa	103.59	31.47	psa	-0.32	47.76
psa	126.991	34.8679	psa	103.46	30.41	psa	-5.43333	43.48333
psa	125	39.8	psa	101.54	25.47	psa	-6.06973	43.38855
psa	120.46	33.195	psa	16.01181	38.35729	psa	-8.4	41.62
psa	119.04	35.128	psa	13.93376	41.24189	psa	-8.58	40.92
psa	117.94	28.45	psa	13.05889	41.49864	psa	-8.64	42.02
psa	117.2849	31.86115	psa	13.05788	41.80601	psa	-9.15158	38.75653
psa	117.05	30.52	psa	13.02467	41.29994	psa	-71.0022	-34.5755
psa	116.52	31.73	psa	12.91568	41.64256	psa	-71.5724	-35.5164
psa	116.35	30.84	psa	12.88454	41.83537	psa	174.6	-39.53
psa	114.48	29.6	psa	12.71493	41.71968	psa	174.6	-36.24
psa	114.17	22.39	psa	12.66108	41.45759	psa	176.33	-37.98
psa	113.73	26.74	psa	12.649	41.932	psa	174.28	-35.43
psa	113.12	29.35	psa	12.51546	41.6118	psa	174.88	-36.78
psa	113.01	25.77	psa	12.25039	42.48713			
psa	112.93	28.22	psa	12.15639	45.67763			
psa	112.52	27.91	psa	12.0903	42.62723			
psa	112.1924	27.45914	psa	12.00393	45.78628			
psa	111.69	29.03	psa	11.88299	44.28535			
psa	111.38	29.58	psa	11.811	45.542			
psa	111.28	30.69	psa	11.13719	45.37561			
psa	111.2	34.77	psa	11.119	44.547			
psa	110.79	32.62	psa	10.84342	45.35085			
psa	110.47	29.11	psa	9.01	42.03			
psa	110.165	29.4	psa	8.173759	45.36737			
psa	109.79	30.29	psa	8.006889	45.44737			
psa	109.69	28.26	psa	7.851	44.948			

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psa	109.42	33.91	psa	7.79315	44.57865			
psa	109.03	34.34	Psa	7.710063	44.42313			

**Table S2.** The accuracy measures achieved by cross-validation (A) and bootstrapping (B) in Multi-Model Framework developed for Psa. Acronyms for models are: QDA= quadratic discriminant analysis, NB= naïve Bayes, LDA= linear discriminant analysis, , LOG= logistic regression, CART= classification and regression tree, CTREE= conditional tree, KNN= K-nearest neighbour, SVM= support vector machine, and NNET= neural network.

Model	Accuracy	rank1	Precision	rank2	Recall	rank3	F.score	rank4	Kappa	rank5	Specificity	rank6	TSS	rank7	Uncertainty	rank8	CV.error	rank9	AUC	rank10
<b>SVM</b>	0.971429	1	0.961818	2	0.977778	1	0.968185	1	0.942099	1	0.965152	2	0.942929	1	0.034483	3	0.06482	1	0.97185	1
<b>NB</b>	0.942857	4	0.944444	3	0.935556	5	0.939117	5	0.880989	5	0.93658	4	0.872136	6	0.011494	1	0.090316	2	0.9704	2
<b>CTREE</b>	0.942857	4	0.926667	5	0.957778	4	0.939527	4	0.885084	3	0.928788	6	0.886566	4	0.017241	2	0.093064	3	0.95534	3
<b>NNET</b>	0.952381	2	0.941818	4	0.965714	2.5	0.952542	2	0.902946	2	0.94697	3	0.912684	2	0.143678	7	0.093511	4	0.95283	4
<b>KNN</b>	0.942857	4	0.925455	6	0.965714	2.5	0.942016	3	0.884112	4	0.931818	5	0.897532	3	0.08046	6	0.107642	6	0.93922	5
<b>LOG</b>	0.933333	6	0.963636	1	0.906984	7	0.929089	6	0.862984	6	0.966667	1	0.873651	5	0.068966	5	0.10824	7	0.9265	6
<b>CART</b>	0.895238	7	0.884957	7	0.923492	6	0.899353	7	0.7804	7	0.853463	7	0.776955	8	0.057471	4	0.10657	5	0.90500	7
<b>QDA</b>	0.880476	8	0.875513	8	0.900715	8	0.890399	8	0.758041	8	0.821349	8	0.792838	7	0.009524	8	0.148303	8	0.87112	8
<b>LDA</b>	0.828571	9	0.81978	9	0.862777	9	0.837515	9	0.645442	9	0.793727	9	0.656504	9	0.009524	4	0.155317	9	0.80818	9

#### A. Cross-Validation

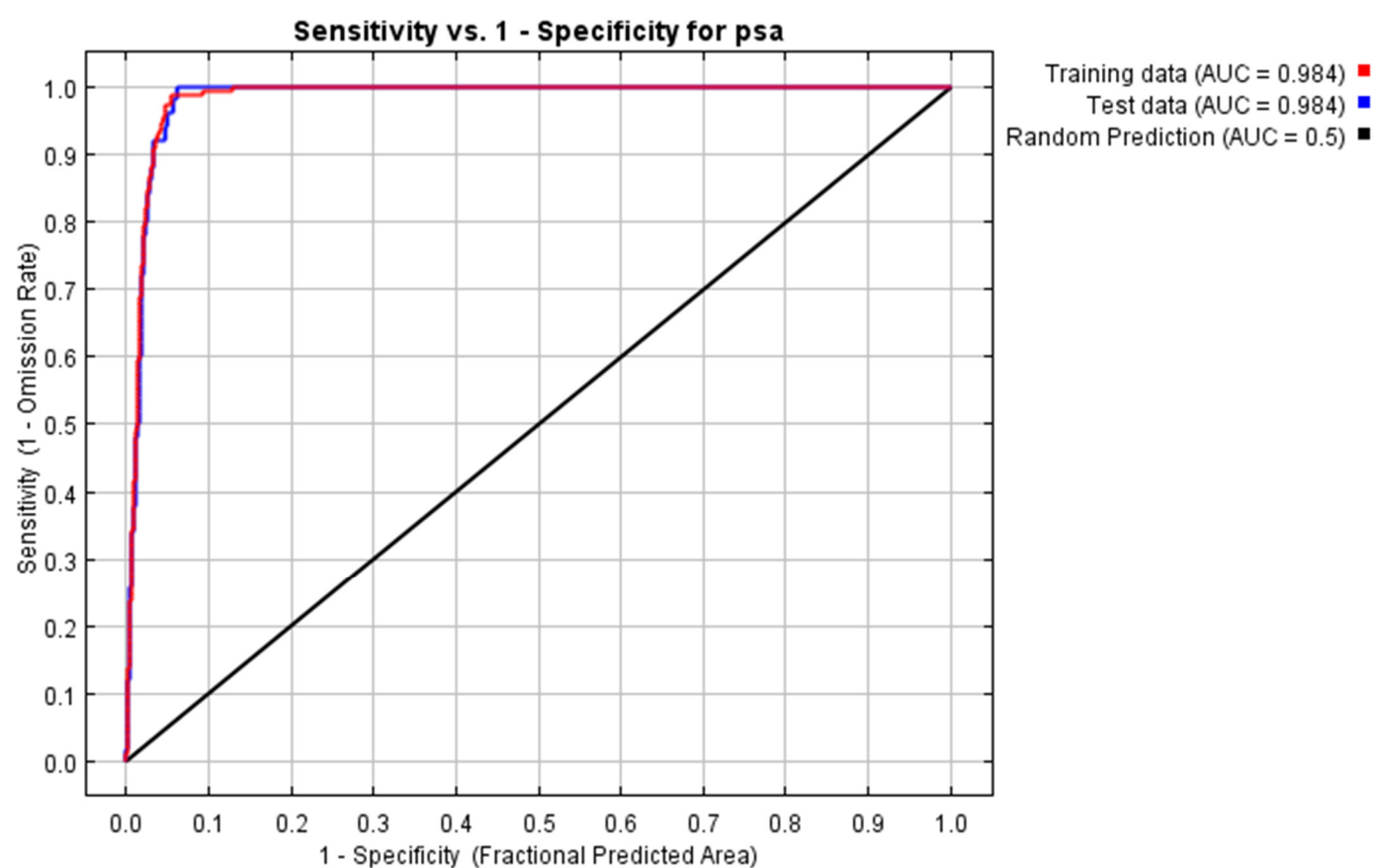
#### B. Bootstrap

Model	Accuracy	rank1	Precision	rank2	Recall	rank3	F.score	rank4	Kappa	rank5	Specificity	rank6	TSS	rank7	Uncertainty	rank8	X.632..error	rank9	AUC	rank10
<b>SVM</b>	0.909494	3	0.899604	4	0.924558	4	0.910323	4	0.817627	3	0.895	4	0.819559	3	0.04023	1	0.085646	4	0.978729	1
<b>KNN</b>	0.929329	1	0.903224	2	0.96369	1	0.931242	1	0.857652	1	0.895541	3	0.859231	1	0.063218	2.5	0.106311	8	0.977408	2
<b>NB</b>	0.921106	2	0.903412	1	0.945285	2	0.922405	2	0.841048	2	0.897631	2	0.842916	2	0.091954	4	0.059122	1	0.973841	3
<b>NNET</b>	0.902943	5	0.901091	3	0.90856	5	0.902624	5	0.804501	5	0.898041	1	0.806601	5	0.132184	5	0.062495	2	0.969084	4
<b>CTREE</b>	0.884555	7	0.892112	5	0.883301	7	0.883327	7	0.7681	7	0.888166	5	0.771468	7	0.195402	7	0.097353	7	0.96631	5
<b>LOG</b>	0.908667	4	0.887556	6	0.93863	3	0.910829	3	0.816098	4	0.880214	7	0.818844	4	0.063218	2.5	0.086317	5	0.958647	6

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<b>CART</b>	0.887205	6	0.887339	7	0.893166	6	0.886648	6	0.773134	6	0.882547	6	0.775713	6	0.137931	6	0.091567	6	0.957987	7
<b>QDA</b>	0.8542	8	0.866853	8	0.881206	8	0.87463	8	0.74045	8	0.862905	8	0.741117	8	0.240476	9	0.075225	7	0.944705	8
<b>LDA</b>	0.853113	9	0.825402	9	0.823547	9	0.85728	9	0.705827	9	0.814089	9	0.707636	9	0.219524	8	0.144015	9	0.910952	9

**Figure S1.** Receiver operating characteristic (ROC) curve produced by MaxEnt for Psa.



**Figure S2** The jackknife of regularized training gain showing the variable importance predicted by MaxEnt.

