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ORIGINAL ARTICLE

An approach to the meso-scale epidemiological behavior of *Plasmodiophora brassicae* from cruciferous crops under tropical conditions

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SUPPLEMENTARY MATERIAL

The authors are fully responsible for both the content and the formal aspects of the supplementary material. No editorial adjustments were made.

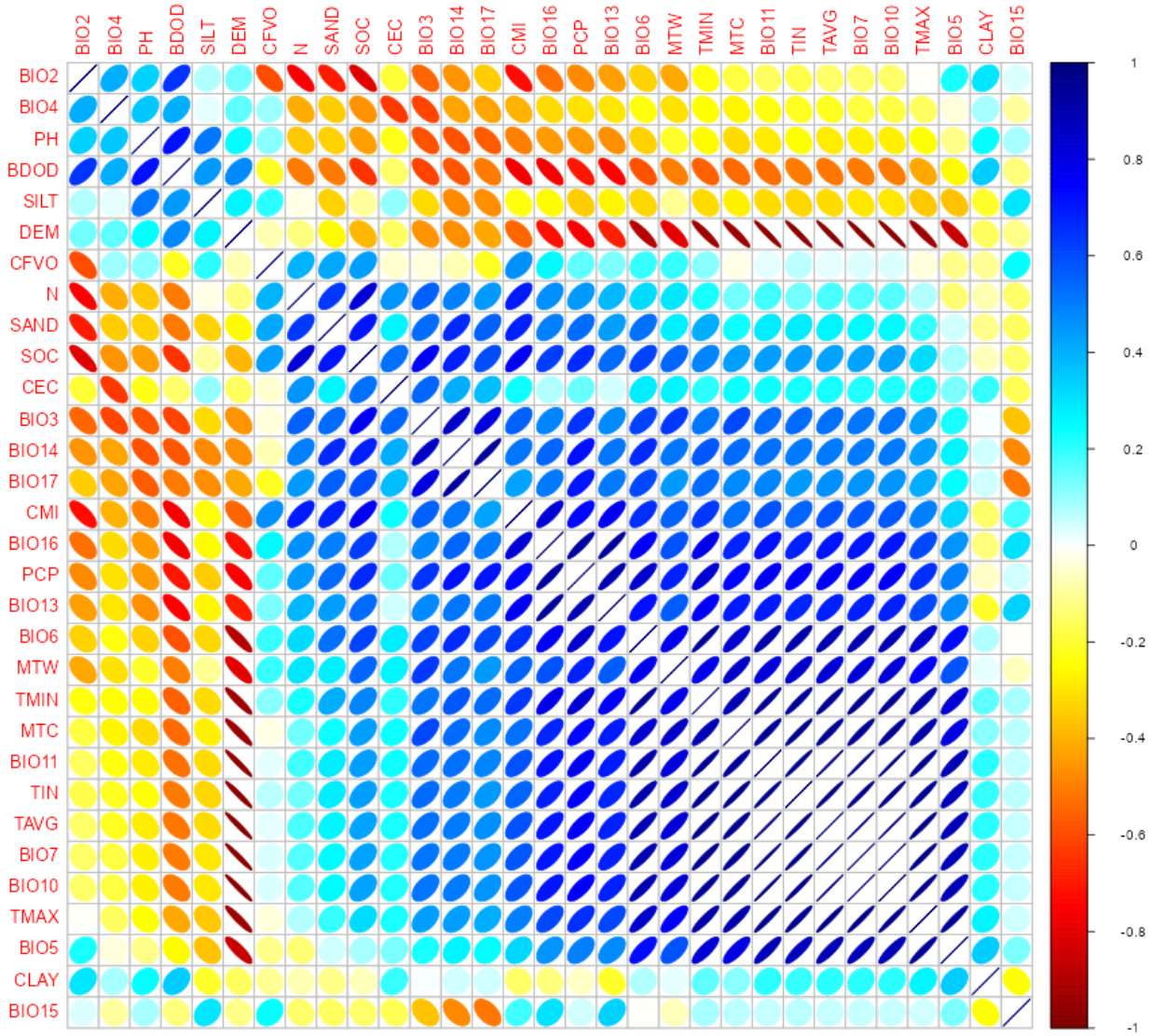
Supplementary file 1. Requirements of the main environmental variables for hosts of *Plasmodiophora brassicae* under tropical conditions, case of Colombia

Variable / Crop	Broccoli	Cauliflower	Cabbage	Napa cabbage
Elevation [m]	1.800–2.600	1.800–2.700	1.600 –2.700	1.800–2.600
Temperature [ºC]	14–25	13–22	14–22º	16–20
Precipitation [mm]	1.200–1.400	1.600–2.000	1.600–2.000	1.600–2.000[2]

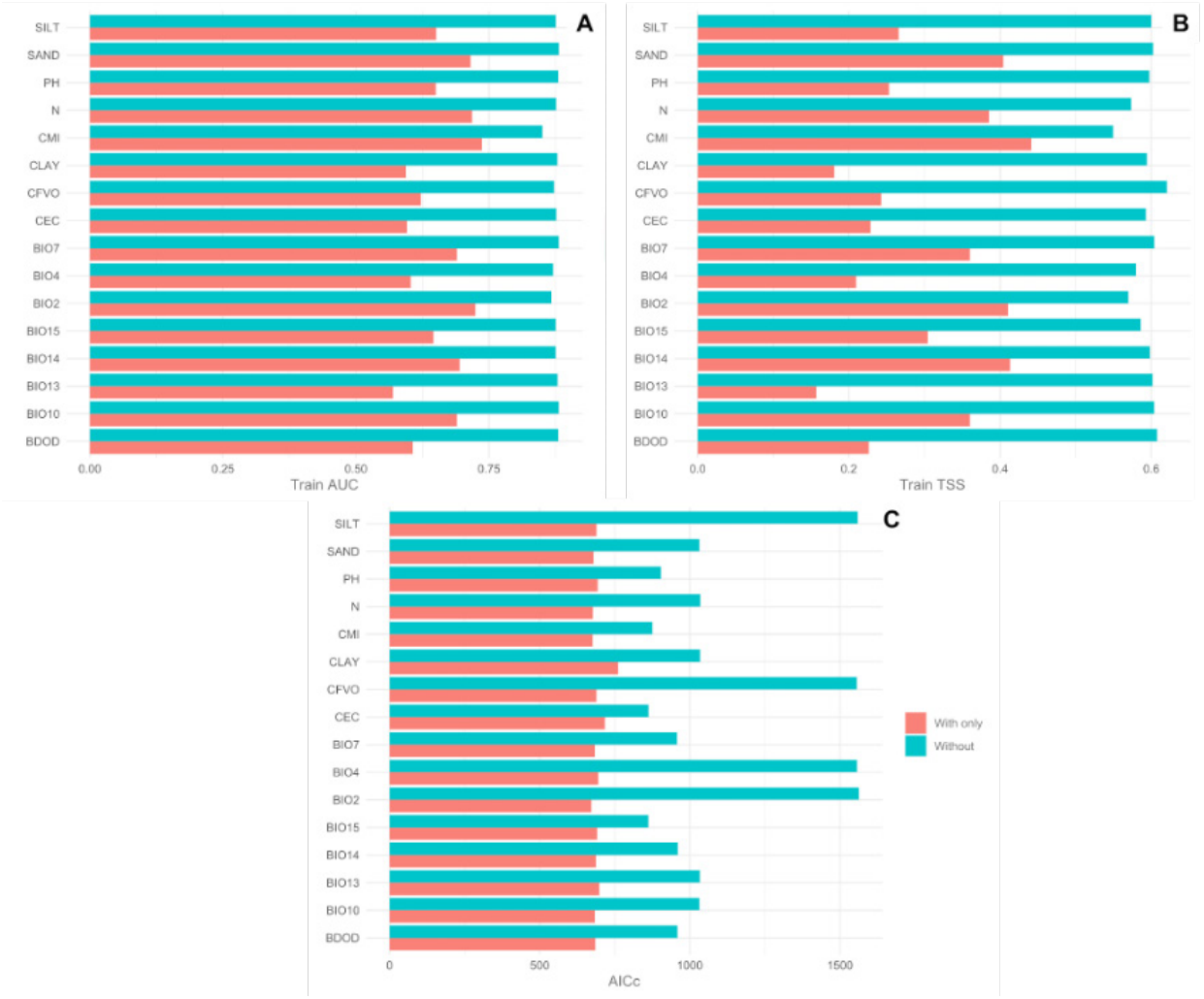
Adapted from: JARAMILLO N. J. E.; DIAZ, D. C.A. 2005. (Compiladores). El Cultivo de las Crucíferas. Corporación Colombiana de Investigación Agropecuaria, CORPOICA, Centro de Investigación La Selva, Rionegro, Antioquia, Colombia. Manual Técnico 4. 176 pages

Supplementary file 2. Preselected environmental variables for use in ecological niche models to determine the geographic distribution of *Plasmodiophora brassicae* in Colombia

Variable	Units	Code	Source
Digital Elevation Model	m	DEM	Earthdata NASA
Climate Moisture Index	–	CMI	ENVIREM
Maximum temperature of the coldest month	°C × 10	MTC	
Minimum temperature of the warmest month	°C × 10	MTW	
Compensated thermal index	°C	TIN	
Apparent density	$cg \cdot cm^{-3}$	BDOD	SoilGrids
Cation exchange capacity	$mmol(c) \cdot kg^{-1}$	CEC	
Volumetric fraction of coarse fragments	$cm^3 \cdot cm^{-3}$	CFVO	
Clay content	$g \cdot kg^{-1}$	CLAY	
Nitrogen content	$cg \cdot kg^{-1}$	N	
pH in H_2O	–	PH	
Sand content	$g \cdot kg^{-1}$	SAND	
Silt conten	$g \cdot kg^{-1}$	SILT	
Organic carbon content in the fine earth fraction	$dg \cdot kg^{-1}$	SOC	
Minimum temperature of the warmest four-month period	°C	BIO10	WorldClim
Maximum temperature of the coldest four-month period	°C	BIO11	
Precipitation of the wettest month	mm	BIO13	
Precipitation of the driest month	mm	BIO14	
Precipitation seasonality	mm	BIO15	
Precipitation of the wettest four-month period	mm	BIO16	
Precipitation of the driest four-month period	mm	BIO17	
Mean diurnal range	°C	BIO2	
Isothermality	°C	BIO3	
Temperature seasonality	°C	BIO4	
Maximum temperature of the warmest month	°C	BIO5	
Minimum temperature of the coldest month	°C	BIO6	
Annual temperature range	°C	BIO7	
Accumulated precipitation	mm	PCP	
Mean temperature	°C	TAVG	
Mean maximum temperature	°C	TMAX	
Mean minimum temperature	°C	TMIN	



Supplementary file 3. Correlation plot from the 31 initial selected environmental predictors to perform the Ecological Niche Model to geographical distributions of *Plasmodiophora brassicae* on Colombia.
Darker colors represent stronger correlations. The oval shapes of the graphs reflect data dispersion



Supplementary file 4. Optimization and selection of variables with predictive capacity and epidemiological meaning for use in the projection of ecological niche models using the Jackknife test based on the AUC (A) TSS (B) and AICc (C)

Supplementary file 5. Results and significant statistical parameters of the MGL according to predictor variables for the edapho-climatic variables of epidemiological importance of Plasmodiophora brassicae in Colombia

Term	Coefficient	SE[1]	Z value	*P* value	Standardized coefficients
Inoculum density					
Intercept	–5.64E–03	2.32E–03	–2.4262	0.01869	3.44E–04
N	3.00E–02	9.06E–03	3.3065	0.00170	1.06E–02
OC	–2.55E–03	7.77E–04	–3.2852	0.00181	–1.04E–02
K	–8.86E–03	3.84E–03	–2.3085	0.02490	–7.12E–03
Mg	–8.83E–03	3.83E–03	–2.3061	0.02505	–2.98E–02
CEC	8.80E–03	3.83E–03	2.3007	0.02537	1.62E–01
Ca	–8.79E–03	3.83E–03	–2.2972	0.02559	–1.32E–01
Na	–8.73E–03	3.80E–03	–2.2967	0.02561	–1.07E–02
Al	–8.72E–03	3.82E–03	–2.2792	0.02671	–4.72E–03
MAVGT	3.31E–04	1.78E–04	1.8642	0.06783	6.61E–04
AAVGT	–2.78E–04	2.20E–04	–1.2648	0.21148	–6.68E–04
Presence / Absence					
CEC	2.22E+02	190.8749	1.1625	0.2450	4087.584
OC	3.37E+01	29.0351	1.1622	0.2451	137.896
AAVGT	2.41E+01	15.0683	1.5969	0.1103	57.884
Intercept	1.79E+02	120.7644	1.4785	0.1393	–2.567
AMAXT	–1.74E+01	11.3532	–1.5340	0.1250	–42.599
N	–3.91E+02	334.6490	–1.1695	0.2422	–137.807
K	–2.21E+02	190.6422	–1.1600	0.2461	–177.690
Na	–2.25E+02	191.9435	–1.1714	0.2414	–276.461
Mg	–2.21E+02	190.5025	–1.1599	0.2461	–746.473
Ca	–2.22E+02	190.9453	–1.1625	0.2450	–3335.010

[1]standard error