

Supplementary Material

Table S1. Predictors selected in each training set of the modelling process and the standardised coefficients (sorted by absolute value of standardised coefficients). [†]Redlands and Brisbane data generated three

training and validation sets, and Mackay generated four counterparts. ^{††}SC = Standardised Coefficients; Recent cases = log (weighted moving average of recent RRV cases in the past month + 1); Week = Week number in a year; TempMax = Maximum air temperature; TempR = Range of air temperature; RHMin = Relative humidity at the time of minimum temperature; RHMax = Relative humidity at the time of maximum temperature; SOI = Southern Oscillation Index; IEO = Index of Education and Occupation; IRSAD = The Index of Relative Socio-economic Advantage and Disadvantage; NDVI = Normalized Difference Vegetation Index. All the lags are weekly lags. ***p value < 0.001, *p value < 0.05.

Dataset [†]	Redlands	Brisbane	Mackay
	Predictors, SC ^{††}	Predictors, SC ^{††}	Predictors, SC ^{††}
Training set 4 (Obs.)	-	-	2007.9.1-2017.9.30 (2417)
Validation set 4 (Obs.)	-	-	2017.10.1-2020.8.30 (932)
	-	-	Week, -0.520 ***
			Recent cases, 0.293 ***
			Rainfall lag 45, -0.231
			TempR lag 51, -0.056
			NDVI lag 49, 0.009
Training set 3 (Obs.)	2010.1.1-2018.1.30 (700)	2012.7.1-2018.7.30 (2761)	2007.9.1-2015.9.30 (1894)
Validation set 3 (Obs.)	2018.2.1-2020.6.30 (531)	2018.8.1-2019.12.30 (734)	2015.10.1-2017.10.30 (571)
	Vapour pressure lag 35, -0.630 ***	Recent cases, 0.463 ***	Week, -0.513 ***
	El Niño lag 51, -0.515 ***	RHMin lag 36, -0.332 ***	Rainfall lag 45, -0.339 *
	Recent cases, 0.515 ***	Vapour pressure lag 9, 0.222	Recent cases, 0.249 ***
	RHMin, 0.224	Vapour pressure lag 29, -0.196	El Niño lag 46, -0.144
	RHMax lag 7, 0.159	<i>Ae.vigilax</i> lag 5, -0.156	TempR lag 51, -0.101
	Rainfall, -0.018	Week, -0.131	NDVI lag 49, -0.026
		<i>Cx.annulirostris</i> lag 14, -0.126	
		<i>Cx.annulirostris</i> , 0.119 *	
		Evapotranspiration lag 12, -0.105	
		RHMax, 0.088	
		<i>Ae.notoscriptus</i> lag 14, 0.070	
		Vapour pressure, -0.030	
		<i>Cx.annulirostris</i> lag 4, 0.024	
		Total mosquito abundance lag 13, 0.018	
		<i>Ae.notoscriptus</i> lag 6, -0.008	

		<i>Ae.vigilax</i> lag 1, -0.007	
		Total mosquito abundance lag 4, -0.006	
Training set 2 (Obs.)	2010.1.1-2016.1.30 (338)	2012.7.1-2016.7.30 (1733)	2007.9.1-2013.9.30 (1431)
Validation set 2 (Obs.)	2016.2.1-2018.2.30 (370)	2016.8.1-2018.8.30 (1028)	2013.10.1-2015.10.30 (487)
	Recent cases, 0.705 ***	El Niño lag 23, -0.647 ***	Rainfall lag 45, -0.354
	Vapour pressure lag 35, -0.438 *	TempR, -0.447	Week, -0.336
	IRSAD, 0.351 ***	<i>Ae.vigilax</i> lag 5, -0.410	Recent cases, 0.303 ***
	Evapotranspiration lag 10, 0.303	Recent cases, 0.376 ***	Evapotranspiration lag 30, -0.279
	TempMax lag 10, -0.123	Pan evaporation lag 12, -0.357 *	El Niño lag 46, -0.189
	Week, -0.062	<i>Cx.annulirostris</i> lag 14, -0.332	Vapour pressure, -0.158
	TempR lag 9, -0.058	Week, -0.244	Total mosquito abundance, 0.155 *
	Pan evaporation lag 16, 0.012	Vapour pressure lag 9, 0.224	RHMax, 0.111
		RHMax, -0.160	TempR lag 51, -0.058
		<i>Ae.vigilax</i> lag 1, -0.134	Vapour pressure lag 4, 0.036
		<i>Cx.annulirostris</i> , 0.119 *	Vapour pressure lag 27, -0.006
		<i>Ae.vittiger</i> lag 4, 0.109	
		Vapour pressure lag 29, -0.105	
		<i>Ae.notoscriptus</i> lag 14, 0.099	
		<i>Cx.annulirostris</i> lag 4, 0.092	
		TempMax lag 11, 0.045	
		Total mosquito abundance lag 13, 0.033	
		<i>Ae.notoscriptus</i> lag 6, -0.027	
		Total mosquito abundance lag 4, -0.014	
		<i>Ae.vittiger</i> lag 10, 0.001	
Training set 1 (Obs.)	2010.1.1-2014.1.30 (152)	2012.7.1-2014.7.30 (824)	2007.9.1-2011.9.30 (963)
Validation set 1 (Obs.)	2014.2.1-2016.2.30 (201)	2014.8.1-2016.8.30 (909)	2011.10.1-2013.10.30 (498)
	IEO, 0.675	SOI, 0.319 *	Week, -0.416
	NDVI lag 47, 0.342	NDVI, -0.270	Recent cases, 0.377 ***
	SOI lag 25, -0.285	RHMin lag 25, -0.249	NDVI lag 49, 0.248
	Rainfall, -0.263	Vapour pressure lag 29, -0.214	Vapour pressure, 0.217
	Pan evaporation lag 16, 0.120	Rainfall lag 10, 0.132	Vapour pressure lag 27, -0.212
	RHMin lag 24, 0.117	SOI lag 42, 0.109	El Niño lag 46, -0.152
	Rainfall lag 2, 0.104	Recent cases, 0.067	Vapour pressure lag 4, -0.125
	Recent cases, 0.077	TempR lag 29, 0.046	Total mosquito abundance, 0.106
	IRSAD, 0.030		TempR lag 51, -0.085