Suplementary Materials

Suppression of Plant Defenses by Herbivorous Mites Is Not Associated with Adaptation to Host Plants

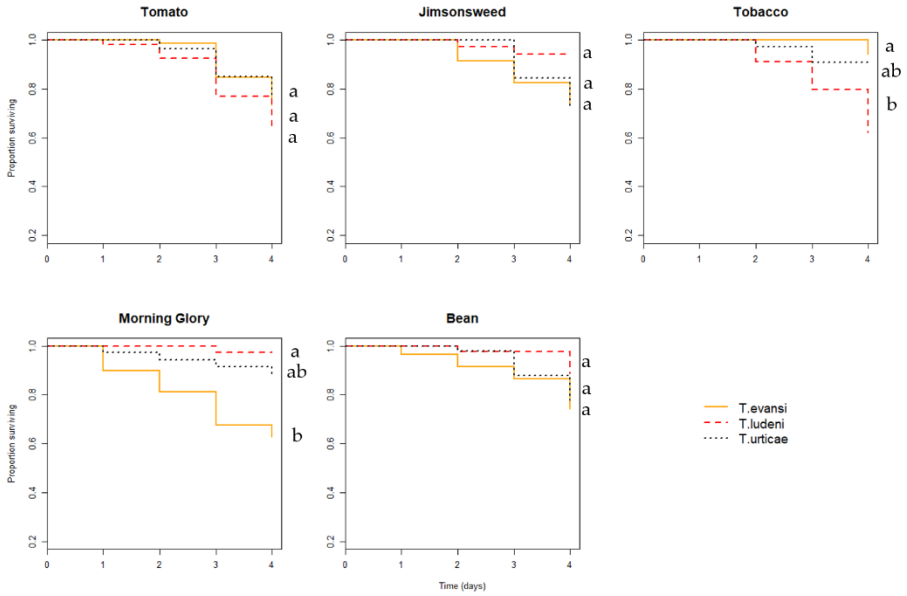

Figure S1. Survival curves of *T. evansi*, *T. ludeni* and *T. urticae* on tomato, jimsonsweed, morning glory or bean leaf discs during 4 days. Different lowercase letters indicate significant differences in survival among mite species within plant species.

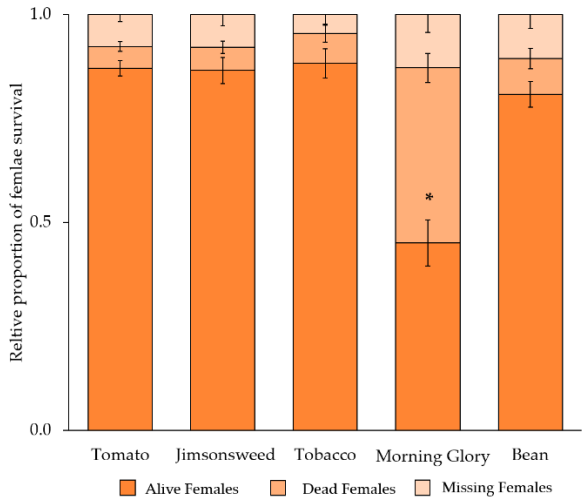

Figure S2. Relative proportion of alive, dead and missing *T. evansi* females after the infestation protocol (bottom to top). The asterisk (*) indicates a significant difference in the proportion of alive females among plant species.

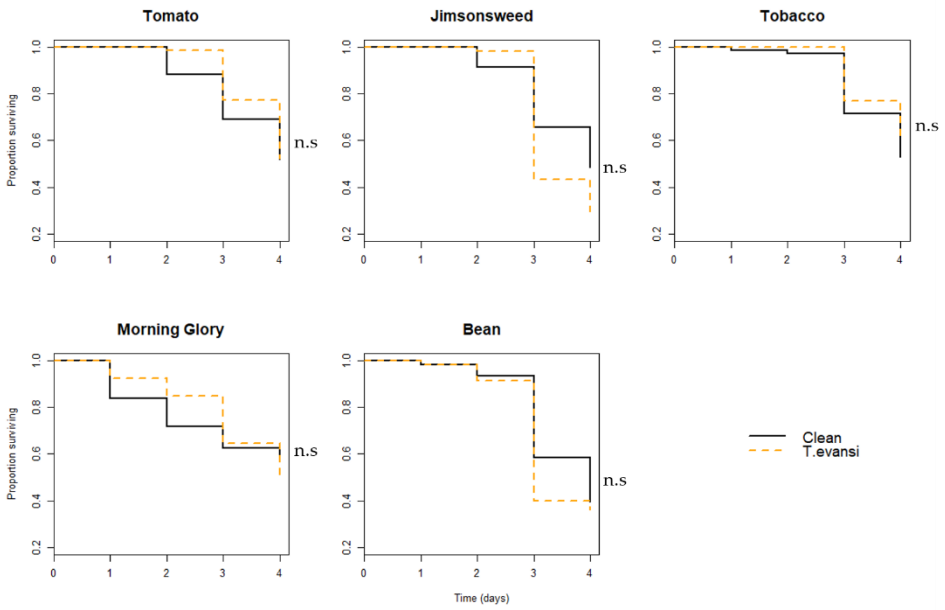

Figure S3. Survival curves of *T. evansi* on tomato, jimsonsweed, morning glory or bean leaf discs, either clean or pre-infested by conspecifics, followed during 4 days. n.s. indicates non-significant differences on daily fecundity among spider mites within plant species.

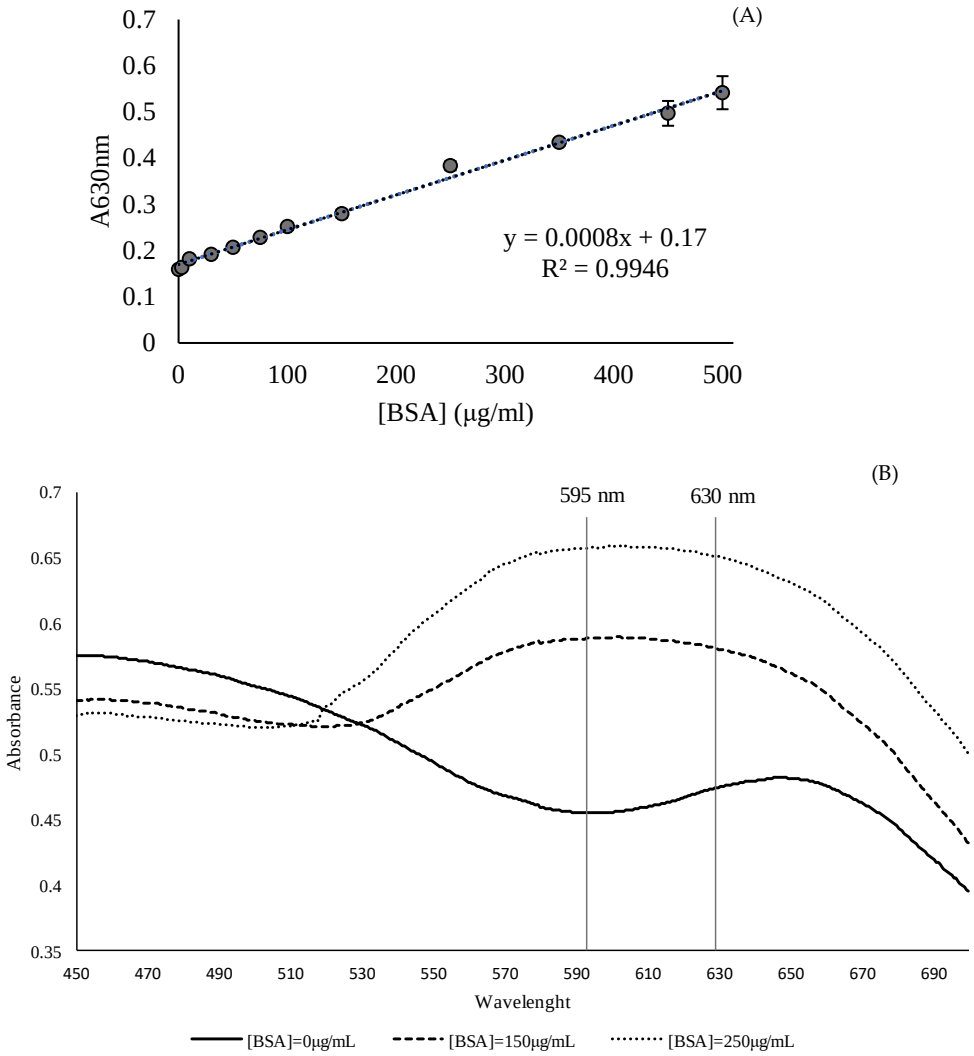

Figure S4. (A) Standard curve for Bradford assay. Markers represent the average (± s.e.) of the three replicated measurements of the known protein content present in the several BSA solutions (µg/mL): 0, 3, 10, 30, 50, 75, 100, 150, 250, 350, 450, 500. (B) Absorbance of three Bradford assays with different concentrations of BSA (0, 150 and 250 µg/mL) in a spectral range of 450 to 700nm. Vertical lines point out the wavelength at which Bradford assay is usually performed (595nm) and the wavelength at which the assay was performed in this project. As represented in figure, the differences in absorbance in the quantification of 150 and 250 µg/mL of protein are minimal.

Table S1. Multiple comparisons using Tukey contrasts (multcomp package)*** $p < 0.001$, * $p < 0.05$.

Variable of Interest		Contrast	Estimate	Std. Error	z value	Pr (>|z|)
Performance of *Tetranychus* species on several host plants						
Survival (leaf disc) (day, censor)	Tobacco	*T. ludeni-T. evansi*	2.053	0.778	2.639	0.025*
		T. urticae-T. evansi	0.519	0.913	0.563	1.000
		T. urticae-T. kudeni	-1.534	0.660	-2.322	0.061
	Morning glory	*T. ludeni-T. evansi*	-2.859	1.039	-2.752	0.018*
		T. urticae-T. evansi	-1.249	0.571	-2.189	0.086
		T. urticae-T. kudeni	1.610	1.118	1.440	0.450
Oviposition Rate (fecundity/day)	Tomato	*T. ludeni-T. evansi*	-1.655	0.090	-18.33	<0.001***
		T. urticae-T. evansi	-1.554	0.091	-17.15	<0.001**
		T. urticae-T. kudeni	0.101	0.084	1.209	0.680
	Tobacco	*T. ludeni-T. evansi*	-0.081	0.086	-0.939	1
		T. urticae-T. evansi	-0.605	0.085	-7.127	<0.001***
		T. urticae-T. kudeni	-0.524	0.075	-7.033	<0.001***
	Morning glory	*T. ludeni-T. evansi*	0.992	0.115	8.611	<0.001***
		T. urticae-T. evansi	-0.075	0.116	-0.651	1
		T. urticae-T. kudeni	-1.067	0.111	-9.600	<0.001***
Dead Juveniles (cbind(deadjuv,unhatch+aliveoffspring)	Tomato	*T. ludeni-T. evansi*	3.449	0.446	7.729	<0.001***
		T. urticae-T. evansi	1.281	0.204	6.278	<0.001***
		T. urticae-T. kudeni	-2.168	0.316	-6.856	<0.001***
	Tobacco	*T. ludeni-T. evansi*	-0.668	0.717	-0.931	1.000
		T. urticae-T. evansi	-1.736	0.697	-2.490	0.038*
		T. urticae-T. kudeni	-1.069	0.917	-1.166	0.731
	Morning glory	*T. ludeni-T. evansi*	-2.862	0.439	-6.521	<0.001***
		T. urticae-T. evansi	-2.995	0.466	-6.426	<0.001***
		T. urticae-T. kudeni	-0.133	0.555	-0.239	1.000
The effect of *T. evansi* infestations on plant defences						
Survival (infestation) Alive females	Jimsonsweed – Bean		0.695	0.265	2.620	0.088
	Morning glory – Bean		-1.755	0.257	-6.828	<0.001***
	Tobacco – Bean		0.453	0.285	1.588	1.000
	Tomato – Bean		0.389	0.265	1.469	1.000
	Morning glory – Jimsonsweed		-2.450	0.375	-6.525	<0.001***
	Tobacco – Jimsonsweed		-0.241	0.423	-0.571	1.000
	Tomato – Jimsonsweed		-0.306	0.411	-0.744	1.000
	Tobacco - Morning glory		2.208	0.389	5.676	<0.001***
	Tomato – Morning glory		2.144	0.368	5.818	<0.001***
	Tomato - Tobacco		-0.064	0.392	-0.164	1.000

Table S2. Fixed explanatory factors (plant, infestation status and interaction) significance on the several wavelengths used in spectral analysis.

The Effect of *T. Evansi* Infestations on Plant Defences						
Variable of Interest		**Fixed explanatory factors**	**Df residuals**	**Df**	**F**	**P**
Reflectance spectroscopy	UV-B (300.4nm)	plant	47.35	4	2.163	0.088
		infestation status	50.10	*1*	*71.65*	<0.001***
		plant*infestation status	42.09	4	1.326	0.276
	UV-B (303.7 nm)	plant	47.11	4	2.344	0.068
		infestation status	50.08	1	50.57	<0.001***
		plant*infestation status	42.07	4	1.415	0.246
	UV-B (307.1 nm)	plant	48.45	4	1.798	0.144
		infestation status	50.28	1	52.43	<0.001***
		plant*infestation status	42.20	4	1.244	0.307
	UV-B (310.5 nm)	plant	47.47	*4*	*3.178*	0.022*
		infestation status	46.09	1	147.1	<0.001***
		plant*infestation status	42.10	4	1.506	0.218
	UV-B (313.9 nm)	plant	47.43	*4*	*2.625*	0.046*
		infestation status	46.10	1	60.08	<0.001***
		plant*infestation status	42.11	4	1.053	0.391

Table S3. Description of the statistical models used in the analysis of the experiments presented in this study.

Variable of Interest		Response variable	Data subset	Sampling size	Maximal Model	Minimal Model	R subroutine
Performance of *Tetranychus* species on several host plants							
Survival (leaf disc)		(day,censor)	Complete	695[1]	plant*spp+(1|block)	1+(1|block)	coxme
			tomato, jimsonsweed, bean	181, 103, 155[1]	spp+(1|block)	1+(1|block)	
			tobacco, prurple	110, 146[1]	spp+(1|block)	spp+(1|block)	
Oviposition Rate		fecundity/day	Complete	692[1]	plant*spp+(1|block)	plant*spp+(1|block)	lmer[n] (λ=0.154)
			jimsonsweed, bean	103, 155[1]	spp+(1|block)	1+(1|block)	
			tomato, tobacco, morning glory	180, 108, 146[1]	spp+(1|block)	spp+(1|block)	
Relative proportion of offspring	Embryonic Mortality	cbind(unhatch,deadjuv+aliveoffspring)	Complete	688[1]	plant*spp+(1|block)	plant+spp+(1|block)	glmmadmb[betab]
	Dead Juveniles	cbind(deadjuv,unhatch+aliveoffspring)	Complete	688[1]	plant*spp+(1|block)	plant*spp+(1|block)	glmmadmb[betab]+ zeroInflation
			jimsonsweed, bean	103, 154[1]	spp+(1|block)	1+(1|block)	
			tomato, tobacco, morning glory	178, 108, 145[1]	spp+(1|block)	spp+(1|block)	
The effect of *T. evansi* infestations on plant defences							
Survival (infestation)	Missing females	cbind(missing,alive+dead)	Complete	36[2]	plant+(1|block)	1+(1|block)	glmmadmb[betab]
	Alive females	cbind(alive,missing+dead)	Complete	36[2]	plant+(1|block)	plant+(1|block)	glmmadmb[betab]
Survival (leaf disc)		(day,censor)	Complete	663[1]	plant*infest+(1|block)	plant+(1|block)	coxme
Oviposition Rate		fecundity/day	Complete	663[1]	plant*infest+(1|block)	plant+(1|block)	lmer[n] (λ=0.265)
Relative proportion of offspring	Embryonic Mortality	cbind(unhatch,deadjuv+aliveoffspring)	Complete	648[1]	plant*infest+(1|block)	plant*infest+(1|block)	glmmadmb[betab]
			jimsonsweed, tobacco, morning glory	118, 143, 109[1]	infest+(1|block)	1+(1|block)	
			tomato, bean	157, 121[1]	infest+(1|block)	infest+(1|block)	
	Dead Juveniles	cbind(deadjuv,unhatch+aliveoffspring)	Complete	648[1]	plant*infest+(1|block)	plant*infest+(1|block)	glmmadmb[betab]
			jimsonsweed, bean	118, 121[1]	infest+(1|block)	1+(1|block)	
			tomato, tobacco, morning glory	157, 143, 109[1]	infest+(1|block)	infest+(1|block)	
	Total Mortality	cbind(total,aliveoffspring)	Complete	648[1]	plant*infest+(1|block)	plant*infest+(1|block)	glmmadmb[betab]
			tomato, jimsonsweed	157, 118[1]	infest+(1|block)	1+(1|block)	
			tobacco, morning glory, bean	143, 109, 121[1]	infest+(1|block)	infest+(1|block)	
Reflectance spectroscopy		ρ303.7, ρ307.1, ρ313.9	Complete	57[2]	plant*infest+(1|block)	infest+(1|block), infest+(1|block), plant+infest+(1|block)	lm[n]
		ρ300.4, ρ310.5	Complete	57[2]	plant*infest+(1|block)	infest+(1|block), plant+infest+(1|block)	lm[n] (λ= -3.600, λ= -11.50)
Trypsin Inhibitors		[TIs]	Complete	63[2]	plant*infest+(1|block)	plant*infest+(1|block)	lm[n] (λ=0.230)
			tomato, jimsonsweed, morning glory, bean	15, 11, 9, 12[2]	infest+(1|block)	1+(1|block)	
			tobacco	16[2]	infest+(1|block)	infest+(1|block)	

In Cox proportional hazard models (coxme) the response variables include censored individuals (whose death was accidental or by drown). Models with binomial error structure require a concatenated response variable binding together the number of successes and failures for a given outcome. Sampling size gives the number of plants or female mites included in each analysis. "Maximal model" gives the complete set of explanatory variables (and their interactions) included in the model. "Minimal model" gives the model containing only the significant variables and their interactions. Round brackets indicate that the variable was fitted as a random factor. Square brackets indicate the error structure used (n: normal errors, betab: betabinomial errors, coxme does not do predictions); zeroInflation indicates that the model accounts for a high proportion of zeros in the dataset; λ indicates the lambda value used in Box-Cox tranformations. plant: plants species, infest: infestation status (clean vs *T. evansi* pre-infested), spp: spider mite species tested, block: block. Survival (leaf disc)- day: day at which females die; Oviposition Rate - fecundity: number of eggs laid by each females; Relative proportion of offspring - embryonic mortality: number of unhatched eggs (=fecundity-hatch), dead juveniles: number of dead juveniles, total mortality: number of unhatched eggs and dead juveniles (total=unhatch+deadjuv); Trypsin inhibitors: estimate concentration of

TIs given by formula (10); Reflectance spectroscopy: ϱ: Spectral reflectance factors in each wavelength tested. [1]Corresponds to all females used (i.e., the number of leaf discs), [2]Corresponds to all plants used

Table S4. Taxonomic description, age and leaf number of plants used.

Order	Family	Subfamily	Genus	Species	Variety (strain)	Producer	Age (weeks)	Leaf number (from below)
Solanales	Solanaceae	Solanoideae	*Solanum*	*lycopersicum*	Moneymaker (*wild-type*)	Johnsons	5	3 or 4
			Datura	*stramonium*		UTAD[1]	5	4
		Nicotianoideae	*Nicotiana*	*tabacum*	Virginia	FCUL[2]	5	6
	Convolvulaceae	Ipomoeeae	*Ipomoea*	*purpurea*	Vigorous	Vilmorin	5	3
Fabales	Fabaceae	Faboideae	*Phaseolus*	*vulgaris*	Contender	Germisem	2	1

Seeds kindly provided by: [1]Dr. António Crespi from Botanical Garden of University of Trás-os-Montes e Alto Douro. [2]Dr. Fernando Dias from Faculty of Sciences of University of Lisbon.