

**Table S1:** Statistical models testing the genetic specificity of the plant-insect food web.

<b>Response</b>	<b>df</b>	<b><i>F</i> or <math>\chi^2</math></b>	<b><i>P</i></b>
Gall size <sup>1</sup>			
Leaf gall	23,57	2.17	<b>0.009</b>
Bud gall	21,44	0.98	0.504
Apical-stem gall	16,12	0.29	0.988
Gall abundance <sup>2</sup>	25,119	202.40	<b>0.001</b>
Leaf gall		74.60	<b>0.001</b>
Bud gall		55.02	<b>0.006</b>
Apical-stem gall		44.47	<b>0.042</b>
Mid-stem gall		28.27	0.295
Composition of gall community <sup>3</sup>	22,89	1.96	<b>0.001</b>
Abundance of gall-parasitoid interactions <sup>2</sup>	25,119	357.10	<b>0.001</b>
Leaf gall			
<i>Platygaster</i> sp.		79.51	<b>0.001</b>
<i>Mesopolobus</i> sp.		50.00	<b>0.009</b>
<i>Torymus</i> sp.		60.11	<b>0.001</b>
<i>Tetrastichus</i> sp.		32.96	0.105
Mymarid sp. A		6.37	0.448
Bud gall			
<i>Platygaster</i> sp.		18.04	0.276
<i>Mesopolobus</i> sp.		6.37	0.497
<i>Torymus</i> sp.		39.81	0.079
<i>Tetrastichus</i> sp.		18.09	0.492
<i>Lestodiplosis</i> sp.		16.05	0.552
Apical-stem gall			
<i>Torymus</i> sp.		23.13	<b>0.048</b>
Mid-stem gall			
<i>Platygaster</i> sp.		6.64	0.452
Composition of gall-parasitoid interactions <sup>3</sup>	12,45	1.57	<b>0.007</b>
Proportion of galls parasitized <sup>4</sup>			
Leaf gall	23,58	75.79	<b>&lt;0.001</b>
<i>Platygaster</i> sp.		93.47	<b>&lt;0.001</b>
<i>Mesopolobus</i> sp.		42.56	<b>0.008</b>
<i>Torymus</i> sp.		42.92	<b>0.007</b>
<i>Tetrastichus</i> sp.		29.55	0.163
Mymarid sp. A		3.97	0.999
Bud gall	21,46	49.84	0.072
Apical-stem gall	18,12	15.69	0.614
Composition of trophic interactions in the plant-insect food web <sup>3</sup>	22,89	1.90	<b>0.001</b>

Notes: <sup>1</sup>GLM (error distribution = Gaussian, link function = identity), log-transformed;  
<sup>2</sup>multivariate GLM (error distribution = negative binomial, link function = log);  
<sup>3</sup>PERMANOVA on Bray-Curtis dissimilarities (999 permutations);  
<sup>4</sup>GLM (error distribution = binomial, link function = logit). *P*-values in bold ( $P < 0.05$ ), italics ( $P < 0.10$ ), and normal font ( $P > 0.10$ ) denote degree of statistical significance.

**Table S2:** Statistical models explaining insect food web responses to genetic variation in coastal willow (*Salix hookeriana*). We report the coefficients of all predictor variables that were included in the final statistical models, which were determined using AIC and likelihood-ratio tests.

Response	Predictors			
Gall size <sup>1</sup>	Salicylates/ Tannins PC1	Flavones/ Flavonols PC1		
Leaf gall	<b>-0.20</b>	<b>-0.26</b>		
Gall abundance <sup>2</sup>	C:N	Flavanones/ Flavanonols PC1	Plant size	
Leaf gall	<i>0.04</i>	-0.03	-0.36	
Bud gall	<i>0.08</i>	-0.07	<b>-1.01</b>	
Apical-stem gall	0.01	<b>0.46</b>	0.26	
Mid-stem gall	0.02	-1.81	<i>-4.77</i>	
Abundance of gall-parasitoid interactions <sup>2</sup>	Leaf gall size	Leaf gall abundance	Bud gall abundance	Apical-stem gall abundance
Leaf gall				
<i>Platygaster</i> sp.	<b>-0.22</b>	<b>1.22</b>	0.20	-0.15
<i>Mesopolobus</i> sp.	<b>-0.27</b>	<b>0.90</b>	-0.26	0.44
<i>Torymus</i> sp.	<i>0.19</i>	<b>0.76</b>	-0.30	0.72
<i>Tetrastichus</i> sp.	-0.24	0.71	0.45	-1.09
Mymarid sp. A	-1.67	<b>20.83</b>	-2.07	3.35
Bud gall				
<i>Platygaster</i> sp.	0.43	0.23	<b>5.81</b>	-14.25
<i>Mesopolobus</i> sp.	0.16	0.30	0.77	1.95
<i>Torymus</i> sp.	<b>-0.17</b>	0.31	<b>1.39</b>	-0.43
<i>Tetrastichus</i> sp.	0.15	0.51	<b>1.83</b>	0.08
<i>Lestodiplosis</i> sp.	0.04	-0.61	<i>1.46</i>	1.75
Apical-stem gall				
<i>Torymus</i> sp.	-0.12	0.05	-0.64	<b>4.09</b>
Mid-stem gall				
<i>Platygaster</i> sp.	1.54	<i>-15.03</i>	0.53	-9.23

Notes: <sup>1</sup>GLM (error distribution = Gaussian, link function = identity), log-transformed;  
<sup>2</sup>multivariate GLM (error distribution = negative binomial, link function = log). *P*-values in bold ( $P < 0.05$ ), italics ( $P < 0.10$ ), and normal font ( $P > 0.10$ ) denote degree of statistical significance.

**Table S3:** Generalized linear models (error distribution = binomial, link function = logit) explaining the proportion of leaf galls parasitized. Final models were determined using AIC and likelihood-ratio tests.

Response	Predictor	df	$\chi^2$	P
Total parasitism	Gall size	1,79	22.28	<0.001
<i>Platygaster</i> sp.	Gall size	1,77	17.58	<0.001
	Gall abundance	1,77	0.73	0.394
	Gall size x abundance	1,77	8.71	0.003
<i>Mesopolobus</i> sp.	Gall size	1,77	7.28	0.007
	Gall abundance	1,77	0.29	0.588
	Gall size x abundance	1,77	4.21	0.040
<i>Torymus</i> sp.	Gall size	1,78	3.83	0.050
	Gall abundance	1,78	5.24	0.022

### Calculating quantitative-weighted linkage density (food-web complexity).

Quantitative-weighted linkage density,  $LD_q$ , was calculated using the following equations. Given an  $s$ -by- $s$  food web matrix  $\mathbf{b} = [b_{ij}]$ , with  $b_{ij}$  corresponding to the number of individuals of species  $j$  (galls or parasitoids) emerging from species  $i$  (willow or galls) per willow branch over a single growing season,  $b_{i.}$  is the sum of row  $i$ ,  $b_{.j}$  is the sum of column  $j$ , and  $b_{..}$  is the total sum. The Shannon indices for the prey and predatory interactions were calculated as,

$$H_j = - \sum_{i=1}^s \frac{b_{ij}}{b_{.j}} \ln \frac{b_{ij}}{b_{.j}}$$

$$H_i = - \sum_{j=1}^s \frac{b_{ij}}{b_{i.}} \ln \frac{b_{ij}}{b_{i.}}$$

The effective number of prey and predatory interactions were calculated as  $N_j^* = \exp(H_j)$  and  $N_i^* = \exp(H_i)$ , respectively. Finally, quantitative-weighted link density was calculated as,

$$LD_q = \frac{1}{2b_{..}} \left( \sum_{i=1}^s b_{i.} N_i^* + \sum_{j=1}^s b_{.j} N_j^* \right)$$