Electronic Supplementary Material

Article: Ectophagous folivores do not profit from rich resources on phylogenetically isolated trees

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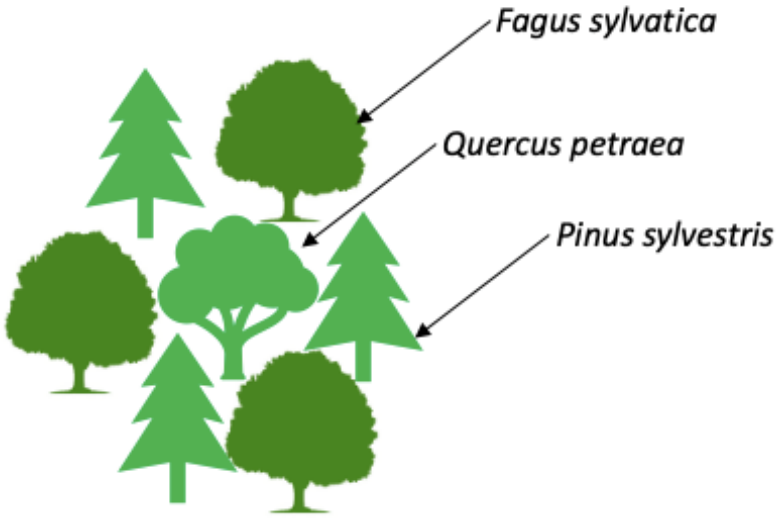
Online Resource 1. Phylogenetic distances and calculation of phylogenetic isolation

Phylogenetic distance between two tree species is the estimated time (in MYBP) since the evolutionary establishment of the clades of a given neighbouring tree species and of oaks. These phylogenetic distances were taken from Vialatte et al. (2010) and Yguel et al. (2011), based on Magallon et al., 1999, Manos et al., 1999, Wikström et al., 2001, Poinar et al., 2007. Note that this is not the most recent common ancestor, as this would give gymnosperms such as pines an extreme weight (Savard et al., 1994), and would essentially render our parameter a simple percentage of pines in the surroundings of the oaks. Rather, this is the age when both sister clades had established their particular characteristics as hosts for insects (i.e. phylogenetic crown-age of the younger of the two lineages and not stem age). Thus, phylogenetic distance corresponds to the smaller of the two crown ages of the two lineages involved (i.e. of oak and of the other tree species) at the corresponding phylogenetic rank (ranks within Angiosperms inferred from APG 2003, 2009, and checked against 2016).

Table S1: Phylogenetic distance between oaks and other trees in our data set based on crown ages (taken from Vialatte et al. 2010 and Yguel et al. 2011).

Species	Phylogenetic rank of separation with oak						Distance (MY)
Chamaecyparis sp.	Spermatophytes	-	-	-	-	-	140
Pinus sylvestris	Spermatophytes	-	-	-	-	-	140
Abies sp.	Spermatophytes	-	-	-	-	-	140
Ilex sp.	Angiosperms	Asterids	-	-	-	-	128
Tilia sp.	Angiosperms	Rosids	Malvids	-	-	-	89.5
Salix caprea	Angiosperms	Rosids	Fabids	Malpighiales	-	-	68
Populus tremula	Angiosperms	Rosids	Fabids	Malpighiales	-	-	68
Rhamnus sp.	Angiosperms	Rosids	Fabids	Rosales	-	-	58.5
Prunus sp.	Angiosperms	Rosids	Fabids	Rosales	-	-	58.5
Sorbus sp	Angiosperms	Rosids	Fabids	Rosales	-	-	58.5
Pyrus sp.	Angiosperms	Rosids	Fabids	Rosales	-	-	58.5
Malus sp.	Angiosperms	Rosids	Fabids	Rosales	-	-	58.5
Ulmus minor	Angiosperms	Rosids	Fabids	Rosales	-	-	58.5
Alnus glutinosa	Angiosperms	Rosids	Fabids	Fagales	Betulaceae	-	54
Corylus avellana	Angiosperms	Rosids	Fabids	Fagales	Betulaceae	-	54
Betula sp.	Angiosperms	Rosids	Fabids	Fagales	Betulaceae	-	54
Carpinus betulus	Angiosperms	Rosids	Fabids	Fagales	Betulaceae	-	54
Fagus sylvatica	Angiosperms	Rosids	Fabids	Fagales	Fagaceae	Fagus	40
Castanea sativa	Angiosperms	Rosids	Fabids	Fagales	Fagaceae	Castanea	40

Degree of phylogenetic isolation of a tree was calculated as mean phylogenetic distances to the trees with which its crown was in contact (or the projections of crowns of trees on the ground were in contact). Hence, the formula to calculate the phylogenetic isolation of an oak is $Phylogenetic\ isolation = \frac{\sum_{i=1}^{n} Phylogenetic\ distance}{n}$; where n is the number of trees in crown contact of that oak. As an example, the case given in the figure below is a *Quercus petraea* surrounded by 3 *Pinus sylvestris* and 3 *Fagus sylvatica*. So, the total number of trees in crown contact with the oak is 6. Phylogenetic distance between a *Quercus petraea* and a *Pinus sylvestris* is 140 MY, and between a *Quercus petraea* and a *Fagus sylvatica* is 40 MY. Hence, the phylogenetic isolation of this oak will be $\frac{140+140+140+40+40+40}{6} = 90$ MY .



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Online Resource 2. Effects of tree pairs on resource use

Species composition and abundance of insects may vary spatially in a forest, so that more proximate trees have more similar insect communities. Therefore, we selected trees that differ in phylogenetic isolation in pairs of spatially proximate trees, rather than selecting the trees randomly (Legendre et al. 2004). To test whether the tree pair defines the various level of use of resources by ectophages, leaf gallers, leaf miners and parasitoids of ectophagous caterpillars, we performed an ANOVA. We found that pair did not significantly affect folivore abundance or folivory (Table S2). So, we do not account for "pair" in further analyses.

Table S2. Results of ANOVA testing for the effect of tree pair on various level of use of resources by ectophages, leaf gallers, leaf miners and parasitoids of ectophagous caterpillars.

Group	Dependent variable	Year	DF	F	p
Ectophages	*Per-leaf folivory*	2006	8	1.574	0.256
		2010	10	0.378	0.932
		2011	10	0.381	0.930
	Per-individual folivory	2010	10	0.873	0.581
		2011	10	1.390	0.298
	Per-leaf abundance	2010	10	0.214	0.989
		2011	10	0.986	0.505
Leaf gallers	*Per-leaf abundance*	2006	8	1.239	0.376
		2010	10	1.472	0.267
		2011	10	1.584	0.231
Leaf miners	*Per-leaf abundance*	2010	10	1.033	0.475
		2011	10	0.719	0.695
Parasitoids	Parasitised caterpillar	2010	10	0.699	0.710
		2011	10	0.756	0.667

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Online Resource 3. Influence of crown position and budburst phenology on the effect of phylogenetic isolation on proportional use of resources

Crown position and budburst phenology did not change the overall effect of phylogenetic isolation on proportional use of resources. After accounting for crown position and budburst phenology, phylogenetic isolation still statistically reduced the tracking of leaf size and not leaf quality by ectophages. Specifically, for ectophages, tracking of leaf size was still reduced at *Per-leaf folivory* level in all three years, and at *Per-individual folivory* level in 2011 but not in 2010 - only the signal at the level of *Per-leaf abundance* was lost. In addition, for ectophages, phylogenetic isolation still consistently did not affect the proportional use of leaf quality. For leaf gallers and leaf miners, phylogenetic isolation still did not consistently affect the proportional use of resources. Moreover, for parasitoids, phylogenetic isolation still affected the proportional use of caterpillars in 2010 but not in 2011. Overall, the models accounting for the effects of crown position and budburst phenology (Table S3) support the results of the models that do not account for these co-variables (Table 2).

Table S3. Statistics of the multiple linear regressions that accounted for the effects of crown position (in 2006) and budburst phenology (in 2010 and 2011). Note that the statistics given in the table is of only the interaction term in a model, but the models also account for the main effects of the variables in the interaction term and the variable given in the column 'Accounted for'. LA = leaf area, LDMC = leaf dry-matter content, C:N = carbon-nitrogen ratio, LPC = leaf phenolics content, TC = total caterpillars, PI = phylogenetic isolation, CP = crown position, BB = budburst.

Group	Use of	Dependent variable	Effects of	Year	Accounted for	t	*p*	DF
Ectophages	Leaf size	*Per-leaf folivory*	LA × PI	2006	CP	-2.495	**0.028**	12
			LA × PI	2010	BB	-3.315	**0.004**	17
			LA × PI	2011	BB	-2.193	**0.043**	16
		Per-individual folivory	LA × PI	2010	BB	-0.956	0.352	17
			LA × PI	2011	BB	-2.518	**0.023**	16
		Per-leaf abundance	LA × PI	2010	BB	-1.166	0.260	17
			LA × PI	2011	BB	1.490	0.154	17
	Leaf quality	*Per-leaf folivory*	LDMC × PI	2006	CP	0.435	0.672	11
			LDMC × PI	2010	BB	0.739	0.470	17
			C:N × PI	2006	CP	-1.408	0.187	11
			C:N × PI	2010	BB	1.011	0.326	17
			LPC × PI	2006	CP	0.165	0.872	13
			LPC × PI	2010	BB	1.352	0.194	17
		Per-individual folivory	LDMC × PI	2010	BB	-0.721	0.481	17
			C:N × PI	2010	BB	-0.460	0.651	17
			LPC × PI	2010	BB	-0.300	0.768	17
		Per-leaf abundance	LDMC × PI	2010	BB	1.171	0.259	16
			C:N × PI	2010	BB	-0.120	0.906	16
			LPC × PI	2010	BB	1.278	0.219	16
Leaf gallers	Leaf size	*Per-leaf abundance*	LA × PI	2006	CP	-0.512	0.617	13
			LA × PI	2010	BB	-0.379	0.709	16
			LA × PI	2011	BB	-1.579	0.133	17
	Leaf quality	*Per-leaf abundance*	LDMC × PI	2006	CP	0.763	0.459	13
			LDMC × PI	2010	BB	1.610	0.127	16
			C:N × PI	2006	CP	0.459	0.654	13
			C:N × PI	2010	BB	5.419	**<0.001**	16
			LPC × PI	2006	CP	1.824	0.093	12
			LPC × PI	2010	BB	0.980	0.342	16
Leaf miners	Leaf size	*Per-leaf abundance*	LA × PI	2010	BB	-0.694	0.498	16
			LA × PI	2011	BB	-0.983	0.339	17
	Leaf quality	*Per-leaf abundance*	LDMC × PI	2010	BB	0.671	0.512	16
			C:N × PI	2010	BB	1.238	0.233	17
			LPC × PI	2010	BB	2.096	0.052	17
Parasitoids	Caterpillars	Parasitised caterpillars	TC × PI	2010	BB	-2.173	**0.044**	17
			TC × PI	2011	BB	-0.003	0.998	17

Online Resource 4. Distribution of phylogenetic isolation, distance to the nearest oak and oak circumference

In our data, the phylogenetic isolation of individual trees, their distance to the nearest oak and oak circumference had continuous distributions (Fig. S4), and were treated as such in our analyses. Phylogenetic isolation has a binary representation in the illustrations in the main body of the article (Fig. 1, 2, 3 and 4) only to permit an easier interpretation.

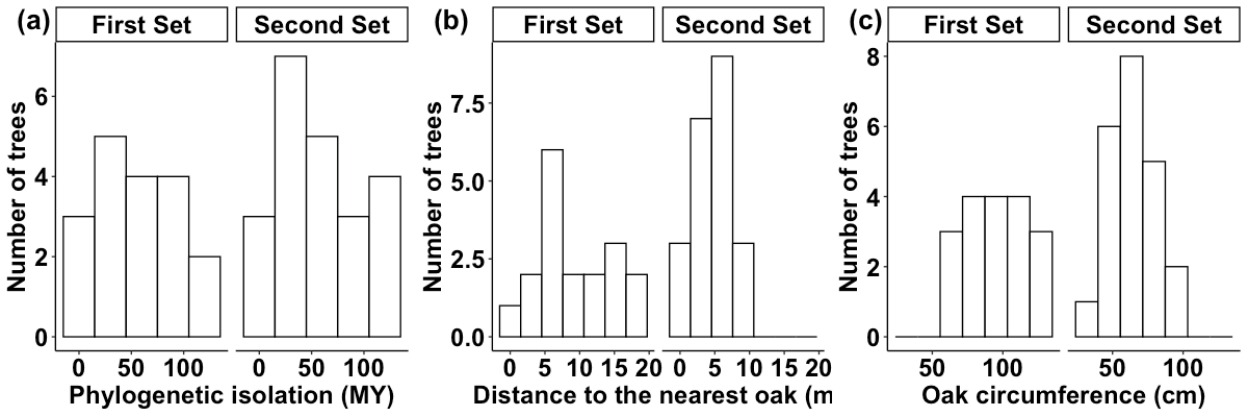

Fig. S4: The distribution of (a) phylogenetic isolation, (b) distance to the nearest oak, and (c) oak circumference for First Set (studied in 2006) and Second Set of trees (studied in 2010 and 2011). The phylogenetic isolation ranged from 5.71 to 106.67 million years in First Set, and from 10 to 125.67million years in Second Set of trees. The spatial distance from the study trees to the nearest adult oak ranged from 2.5 to 18.9 m in First Set and from 0.70 to 9.40 m in Second Set of trees. The circumference of the study trees was measured at breast height, and ranged from 57.75 to 133.1 cm in First Set, and from 37.8 to 91.4 cm in Second Set of trees.

Online Resource 5. Community composition and species traits of ectophages

Table S5A: Community composition of ectophages

Year	Tree	*Acrobasis consociella*	*Acrobasis repandana*	*Aglia tau*	*Agriopis aurantaria*	*Aleimma loeflingiana*	*Archips Podana*	*Archips sp*	*Biston strataria*	*Carcina quercana*	*Catocala promissa*	*Catocala sponsa*	*Conistra sp*	*Cyclophora linearia*	*Ennomos quercinaria*	*Epirrita autumnata*	*Erannis defoliaria*	*Eupithecia abbreviata*	*Eupithecia sp*	*Eupsilia transversa*	*Hedya nubifera*	*Lymantria dispar*	*Lymantria monacha*	*Operophtera brumata*	*Orgyia antiqua*	*Orthosia cerasi*	*Orthosia incerta*	*Orthosia munda*	*Pammene argyrana*	*Phycita roborella*	*Poecilocampa populi*	*Polyploca ridens*	*Spilonota ocellana*	*Tortrix viridana*	*Undetermined*	*Ypsolopha parenthesella*	*Ypsolopha ustella*	*Zeiraphera isertana*
2010	2.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	4	5	1	0	2
	2.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
	4.1	0	0	0	1	0	0	4	0	2	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	2	0	0	0	0	0	0	0	1	1	0	0	1
	4.2	0	0	0	0	0	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	1
	5.1	0	0	0	0	0	0	4	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	2	3	1	1	1
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	7.1	0	2	0	0	1	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	2	0	0	0
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	8.1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	2	2	0	0	0
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	9.1	0	0	0	1	0	0	6	1	0	0	0	3	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0	1	0	0	2	0	0	0
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	14	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
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	6.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0
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	8.1	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	1	0	0
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	9.2	1	0	0	1	0	0	1	0	2	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0
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	14	0	0	0	0	0	0	3	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	3	1	0	0	0	0	0	0	0	9	0	0	0
	14	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3	0	0	0
	X.1	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0
	X.2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0

Table S5B: Traits of ectophage species that are present in the community. Information are taken from the websites Catalogue of the Lepidoptera of Belgium (De Prins and Steeman 2021), and Guide to the moths of Great Britain and Ireland (Kimber 2021).

Species	Average wingspan (mm)	Host-plant specialisation	Fly between June-October	Wingless females
Acrobasis consociella	20.5	Specialist	Yes	No
Acrobasis repandana	22.5	Specialist	Yes	No
Aglia tau	72.0	Generalist	No	No
Agriopis aurantaria	31.0	Generalist	No	Yes
Aleimma loeflingiana	16.5	Generalist	Yes	No
Archips Podana	22.0	Specialist	Yes	No
Archips sp	20.8	Specialist	Yes	No
Bena bicolorana	42.5	Specialist	Yes	No
Carcina quercana	19.0	Generalist	Yes	No
Catocala promissa	62.5	Specialist	Yes	No
Catocala sponsa	65.0	Specialist	Yes	No
Conistra sp	33.9	Generalist	No	No
Cyclophora linearia	29.5	Specialist	Yes	No
Ennomos quercinaria	46.0	Generalist	Yes	No
Epirrita autumnata	42.0	Generalist	Yes	No
Erannis defoliaria	35.0	Generalist	No	Yes
Eupithecia abbreviata	20.5	Generalist	No	No
Eupithecia sp	17.5	Generalist	No	No
Eupsilia transversa	37.0	Generalist	No	No
Hedya nubifera	18.0	Generalist	Yes	No
Lymantria dispar	43.5	Generalist	Yes	No
Lymantria monacha	40.0	Generalist	Yes	No
Operophtera brumata	25.0	Generalist	No	Yes
Orgyia antiqua	27.5	Generalist	Yes	Yes
Orthosia cerasi	37.0	Generalist	No	No
Orthosia incerta	37.5	Generalist	No	No
Orthosia munda	41.0	Generalist	No	No
Pammene argyrana	11.5	Specialist	No	No
Phycita roborella	26.5	Specialist	Yes	No
Poecilocampa populi	37.5	Generalist	No	No
Polyploca ridens	32.5	Specialist	No	No
Spilonota ocellana	14.5	Generalist	Yes	No
Tortrix viridana	20.5	Specialist	Yes	No
Ypsolopha parenthesel	18.0	Generalist	Yes	No
Ypsolopha ustella	17.5	Specialist	No	No
Zeiraphera isertana	17.0	Specialist	Yes	No

References:

De Prins W, Steeman C (2021) Catalogue of the Lepidoptera of Belgium. https://projects.biodiversity.be/lepidoptera/. Accessed 24 Feb 2022

Kimber I (2021) UKMoths | Guide to the moths of Great Britain and Ireland. https://ukmoths.org.uk/. Accessed 24 Feb 2022

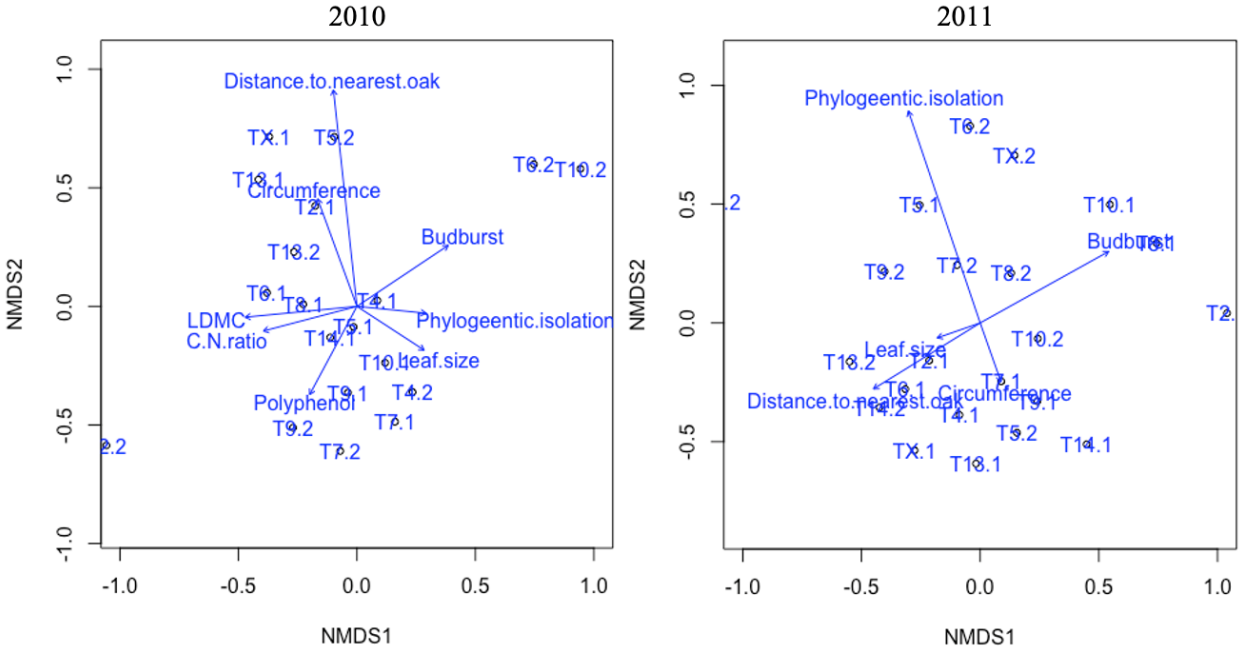
Online Resource 6. Role of different tree traits and leaf traits to shape species composition in ectophage communities

In both the years 2010 and 2011, phylogenetic isolation has contributed the most to shape the species composition in ectophage communities on individual trees, albeit only significantly in 2010.

Table S6: Contributions of different tree traits and leaf traits to shape the species composition of ectophagous communities on individual trees. Tested by a Permutational Multivariate Analysis of Variance (PERMANOVA) using the R package *vegan*. PI = phylogenetic isolation, DIS = Distance to nearest oak, TC = Tree circumference, BB = budburst, LA = leaf area, LDMC = leaf dry-matter content, C:N = carbon-nitrogen ratio, LPC = leaf phenolics content

Effects of Year:	2010						2011					
	Df	SumsOfSqs	MeanSqs	F.Model	R2	Pr(>F)	Df	SumsOfSqs	MeanSqs	F.Model	R2	Pr(>F)
PI	1	0.537	0.537	1.934	0.089	**0.040**	1	0.308	0.308	1.363	0.064	0.213
DIS	1	0.444	0.444	1.600	0.073	0.110	1	0.273	0.273	1.208	0.057	0.260
TC	1	0.281	0.281	1.011	0.046	0.422	1	0.179	0.179	0.793	0.037	0.616
BB	1	0.193	0.193	0.695	0.032	0.753	1	0.203	0.203	0.898	0.042	0.549
LA	1	0.134	0.134	0.481	0.022	0.893	1	0.250	0.250	1.108	0.052	0.374
LDMC	1	0.283	0.283	1.018	0.047	0.408	NA	NA	NA	NA	NA	NA
C:N	1	0.177	0.177	0.638	0.029	0.781	NA	NA	NA	NA	NA	NA
LPC	1	0.397	0.397	1.429	0.066	0.158	NA	NA	NA	NA	NA	NA
Residuals	13	3.611	0.278	0.596			16	3.616	0.226	0.749		
Total	21	6.058	1.000				21	4.830	1.000			

The figure represents the ordination plots of Nonmetric Multidimensional Scaling (NMDS), where datapoints are individual trees, and the arrows represent a tree trait or a leaf trait.



Online Resource 7. Effects of distance to the nearest oak, oak circumference and percentage pines in the neighbourhood on proportional use of resources

(A) Distance to the nearest oak and oak circumference: We compared effects of phylogenetic isolation of individual host trees on the proportional use of resources to that of two more commonly studied variables, isolation in space and availability of the resource in time. Isolation in space was measured as the spatial distance of the study oaks to its nearest adult oak. We used circumference of the tree at breast height as a proxy of the age of a tree. Neither the distance to the nearest oak (Table S7A.a), nor the circumference of the trees (Table S7A.b) showed consistent significant effect on proportional use of resources. Note that the statistics given in the table is of only the interaction term in a model, but the models also accounted for the main effects of the variables in the interaction term. LA = leaf area, LDMC = leaf dry-matter content, C:N = carbon-nitrogen ratio, LPC = leaf phenolics content, TC = total caterpillars, DIS = distance to the nearest oak, OC = oak circumference.

Table S7A.a: Effects of distance to the nearest oak on proportional use of resources.

Group	Use of	Dependent variable	Effects of	Year	t	*p*	DF
Ectophages	Leaf size	*Per-leaf folivory*	LA × DIS	2006	1.532	0.148	14
			LA × DIS	2010	-1.010	0.326	18
			LA × DIS	2011	-1.039	0.312	18
		Per-individual folivory	LA × DIS	2010	0.487	0.633	17
			LA × DIS	2011	-0.887	0.387	18
		Per-leaf abundance	LA × DIS	2010	-0.778	0.447	18
			LA × DIS	2011	0.713	0.485	18
	Leaf quality	*Per-leaf folivory*	LDMC × DIS	2006	0.569	0.579	13
			LDMC × DIS	2010	0.143	0.888	17
			C:N × DIS	2006	-0.588	0.567	13
			C:N × DIS	2010	1.049	0.310	16
			LPC × DIS	2006	0.166	0.871	14
			LPC × DIS	2010	-0.921	0.369	18
		Per-individual folivory	LDMC × DIS	2010	-2.672	**0.016**	18
			C:N × DIS	2010	1.893	0.075	18
			LPC × DIS	2010	Invalid model		
		Per-leaf abundance	LDMC × DIS	2010	1.371	0.188	18
			C:N × DIS	2010	-1.227	0.236	18
			LPC × DIS	2010	0.882	0.389	18
Leaf gallers	Leaf size	*Per-leaf abundance*	LA × DIS	2006	-2.783	**0.016**	13
			LA × DIS	2010	0.541	0.595	17
			LA × DIS	2011	Invalid model		
	Leaf quality	*Per-leaf abundance*	LDMC × DIS	2006	0.653	0.525	14
			LDMC × DIS	2010	-1.757	0.097	17
			C:N × DIS	2006	0.943	0.362	14
			C:N × DIS	2010	2.927	**0.009**	17
			LPC × DIS	2006	0.792	0.442	14
			LPC × DIS	2010	-1.997	0.063	16
Leaf miners	Leaf size	*Per-leaf abundance*	LA × DIS	2010	0.541	0.595	17
			LA × DIS	2011	-1.536	0.143	17
	Leaf quality	*Per-leaf abundance*	LDMC × DIS	2010	-1.757	0.097	17
			C:N × DIS	2010	2.927	**0.009**	17
			LPC × DIS	2010	-1.997	0.063	16
Parasitoids	Caterpillars	Parasitised caterpillars	TC × DIS	2010	-0.673	0.509	18
			TC × DIS	2011	-1.075	0.299	16

Table S7A.b: Effects of oak circumference on proportional use of resources.

Group	Use of	Dependent variable	Effects of	Year	t	*p*	DF
Ectophages	Leaf size	*Per-leaf folivory*	LA × OC	2006	1.444	0.171	14
			LA × OC	2010	-0.266	0.793	18
			LA × OC	2011	1.907	0.074	17
		Per-individual folivory	LA × OC	2010	1.489	0.156	16
			LA × OC	2011	0.716	0.483	18
		Per-leaf abundance	LA × OC	2010	-0.988	0.336	18
			LA × OC	2011	-0.380	0.708	18
	Leaf quality	*Per-leaf folivory*	LDMC × OC	2006	-0.805	0.434	14
			LDMC × OC	2010	0.935	0.363	17
			C:N × OC	2006	0.213	0.834	14
			C:N × OC	2010	-0.402	0.692	17
			LPC × OC	2006	-1.910	0.077	14
			LPC × OC	2010	0.290	0.775	18
		Per-individual folivory	LDMC × OC	2010	Invalid model		
			C:N × OC	2010	0.800	0.434	18
			LPC × OC	2010	Invalid model		
		Per-leaf abundance	LDMC × OC	2010	0.808	0.430	18
			C:N × OC	2010	-0.770	0.451	18
			LPC × OC	2010	0.036	0.972	18
Leaf gallers	Leaf size	*Per-leaf abundance*	LA × OC	2006	-0.334	0.743	14
			LA × OC	2010	-1.489	0.155	17
			LA × OC	2011	Invalid model		
	Leaf quality	*Per-leaf abundance*	LDMC × OC	2010	Invalid model		
			LDMC × OC	2006	-1.743	0.105	13
			C:N × OC	2006	0.913	0.377	14
			C:N × OC	2010	1.211	0.243	17
			LPC × OC	2010	Invalid model		
			LPC × OC	2006	-0.419	0.682	14
Leaf miners	Leaf size	*Per-leaf abundance*	LA × OC	2010	-1.489	0.155	17
			LA × OC	2011	-1.225	0.237	17
	Leaf quality	*Per-leaf abundance*	LDMC × OC	2010	Invalid model		
			C:N × OC	2010	1.211	0.243	17
			LPC × OC	2010	Invalid model		
Parasitoids	Caterpillars	Parasitised caterpillars	TC × OC	2010	-1.909	0.073	17
			TC × OC	2011	-1.060	0.303	18

(B) Percentage pines in the neighbourhood: Phylogenetic isolation is the mean phylogenetic distance to the neighbours and the value can be determined mainly by the neighbours having large phylogenetic distance to the focal tree. Our focal oak has the maximum phylogenetic distance to pines (among the neighbouring trees). Hence, we compared effects of phylogenetic isolation of individual host trees on the proportional use of resources to that of percentage of pines in the neighbourhood. We conducted these analyses for all groups of insects (extophages, leaf gallers, leaf miners and parasitoids), but not for the subgroups within ectophages. We found that percentage pine has a weaker effect than phylogenetic isolation. Percentage pines has a significant interaction effect only in 6 out of 35 cases (Table S7B), whereas phylohenetic isolation has a significant interaction effect in 9 out of those 35 cases (Table 2). In the 6 cases where both phylogenetic isolation and percentage pines have a significant interaction effect, there are 4 cases where phylogenetic isolation has a smaller p-value than percentage pines (compare between Table 2 and Table S7B). Hence, Phylogenetic isolation explains proportional use of resources more

consistently and more strongly than percentage pines in the neighbourhood. Note that the statistics given in the table is of only the interaction term in a model, but the models also accounted for the main effects of the variables in the interaction term. LA = leaf area, LDMC = leaf dry-matter content, C:N = carbon-nitrogen ratio, LPC = leaf phenolics content, TC = total caterpillars, % Pines= percentage pines.

Table S7B: Effects of percentage of pines on proportional use of resources.

Group	Use of	Dependent variable	Effects of	Year	t	*p*	DF
Ectophages	Leaf size	*Per-leaf folivory*	LA × % Pines	2006	-0.031	0.975	14
			LA × % Pines	2010	-3.159	**0.005**	18
			LA × % Pines	2011	-2.538	**0.021**	17
		Per-individual folivory	LA × % Pines	2010	0.549	0.590	18
			LA × % Pines	2011	-2.197	**0.042**	17
		Per-leaf abundance	LA × % Pines	2010	-2.268	**0.037**	17
			LA × % Pines	2011	1.390	0.181	18
	Leaf quality	*Per-leaf folivory*	LDMC × % Pines	2006	0.555	0.588	14
			LDMC × % Pines	2010	0.389	0.702	18
			C:N × % Pines	2006	-0.452	0.658	14
			C:N × % Pines	2010	1.158	0.262	18
			LPC × % Pines	2006	0.338	0.740	14
			LPC × % Pines	2010	0.744	0.467	18
		Per-individual folivory	LDMC × % Pines	2010	-1.342	0.197	17
			C:N × % Pines	2010	-0.545	0.592	18
			LPC × % Pines	2010	-0.403	0.692	18
		Per-leaf abundance	LDMC × % Pines	2010	1.417	0.174	17
			C:N × % Pines	2010	0.209	0.837	17
			LPC × % Pines	2010	0.615	0.615	18
Leaf gallers	Leaf quality	*Per-leaf abundance*	LA × % Pines	2006	-0.686	0.504	14
			LA × % Pines	2010	0.222	0.827	17
			LA × % Pines	2011	0.222	0.827	17
	Quality	*Per-leaf abundance*	LDMC × % Pines	2006	0.867	0.400	14
			LDMC × % Pines	2010	Invalid model		
			C:N × % Pines	2006	0.987	0.340	14
			C:N × % Pines	2010	5.473	**<0.001**	17
			LPC × % Pines	2006	1.018	0.326	14
			LPC × % Pines	2010	Invalid model		
Leaf miners	Leaf size	*Per-leaf abundance*	LA × % Pines	2010	-1.155	0.263	18
			LA × % Pines	2011	-1.179	0.255	17
	Leaf quality	*Per-leaf abundance*	LDMC × % Pines	2010	0.4	0.694	18
			C:N × % Pines	2010	1.505	0.150	18
			LPC × % Pines	2010	1.351	0.194	17
Parasitoids	Caterpillars	Parasitised caterpillars	TC × % Pines	2010	-2.436	**0.026**	17
			TC × % Pines	2011	-0.904	0.378	18

Online Resource 8. Logistic regression of presence/absence of species with wingless females

We conducted a logistic regression to test for an effect of phylogenetic isolation on the presence of species with wingless females. Phylogenetic isolation had a negative effect in 2010 ($z = -2.079$, $p = 0.038$, $df = 20$), but no effect in 2011 ($z = 0.834$, $p = 0.404$, $df = 20$).