

Article

The Thermoregulatory Behavior of Nectar Foraging Polistine Wasps (*Polistes dominula* and *Polistes gallicus*) in Different Climate Conditions

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Supplementary Materials

Table 1. Statistical details of the correlation between the microclimate data (T_a , ambient temperature; T_{flower} , temperature in inflorescence; T_{globe} , temperature weather station and radiation) and the operative temperature model (T_e), given is $R^2/P/N$.

Species	T_a	T_{flower}	T_{globe}	radiation
<i>P. dominula</i>	0.81458/0.0001/116	0.59829/0.0001/116	0.66402/0.0001/52	0.42698/0.0001/116
<i>P. gallicus</i>	0.84832/0.0001/85	0.83174/0.0001/85	0.84631/0.0001/85	0.16862/0.0001/85

Table S2. Statistical details and the fit parameters of linear regressions of all body parts and species.

Figure	Species	Flower/body part	Parameter		R ²	P	N	
			A	B				
Figure 3a	<i>P. dominula</i>	<i>lovage</i>						
		head	-6.52726	1.38051	0.73473	<0.0001	180	
		thorax	-5.95509	1.4034	0.70661	<0.0001	180	
			abdomen	-5.90242	1.34284	0.74344	<0.0001	180
	<i>P. dominula</i>	<i>fennel</i>						
		head	-3.63029	1.31056	0.71592	<0.0001	162	
		thorax	-4.80459	1.38879	0.67883	<0.0001	162	
			abdomen	-5.08199	1.346	0.73992	<0.0001	162
	<i>P. gallicus</i>	<i>water</i>						
		thorax	1.40319	1.18965	0.16862	<0.0001	60	
		<i>fennel</i>						
			head	3.578	0.9943	0.81277	<0.0001	263
		thorax	4.38022	0.99513	0.78421	<0.0001	263	
		abdomen	3.09637	1.00644	0.79859	<0.0001	263	
not shown	<i>P. dominula</i> *	<i>lovage</i>						
		head	-12.16368	1.58158	0.88818	<0.0001	64	
		thorax	-10.80405	1.56682	0.87858	<0.0001	64	
			abdomen	-11.9229	1.56013	0.85083	<0.0001	64
	<i>P. dominula</i> *	<i>fennel</i>						
		head	-4.01332	1.27794	0.69992	<0.0001	52	
		thorax	-6.33345	1.38548	0.75847	<0.0001	52	
			abdomen	-1.46829	1.14549	0.76475	<0.0001	52
	<i>P. gallicus</i> *	<i>fennel</i>						
		head	-1.81774	1.18405	0.87496	<0.0001	85	
		thorax	0.21001	1.13863	0.84832	<0.0001	85	
			abdomen	-0.71786	1.11614	0.87828	<0.0001	85
Figure 3b	<i>P. dominula</i>	<i>lovage</i>						
		T _{thorax} -T _a	-5.95509	0.4034	0.16239	<0.0001	180	
		T _{thorax} -T _a *	-9.64395	0.48861	0.4582	<0.0001	64	
	<i>P. dominula</i>	<i>fennel</i>						
		T _{thorax} -T _a	-4.80459	0.38879	0.13787	<0.0001	162	
		T _{thorax} -T _a *	-6.33345	0.38548	0.18367	<0.0001	52	
<i>P. gallicus</i>	<i>fennel</i>							
	T _{thorax} -T _a	4.38022	-0.00487	-0.00374	>0.05	263		
	T _{thorax} -T _a *	0.41848	0.12913	0.06941	<0.01	85		
Figure 3c	<i>P. dominula</i>	<i>lovage</i>						
		T _{thorax} -T _a	2.57321	0.00322	0.17135	<0.0001	180	
		T _{thorax} -T _a *	2.55625	0.00336	0.32607	<0.0001	64	
	<i>P. dominula</i>	<i>fennel</i>						
		T _{thorax} -T _a	2.64198	0.00482	0.53159	<0.0001	162	
		T _{thorax} -T _a *	1.6017	0.00508	0.55684	<0.0001	52	
<i>P. gallicus</i>	<i>fennel</i>							
	T _{thorax} -T _a	1.47665	0.00418	0.35314	<0.0001	263		
	T _{thorax} -T _a *	2.19173	0.00341	0.25382	<0.0001	85		

* dead wasps

Table S3. Summary of multifactorial ANOVA statistics for the thorax temperature excess ($T_{th}-T_a$) in Figs 3b.

<i>P. dominula</i> - lovage	Sum of squares	DF	Mean square	F-Quotient	P-Value
Covariable					
Radiation	12.3507	1	12.3507	4.23	<0.05
Main effect					
Temperature	341.235	78	4.37481	1.5	<0.05
Residuals	291.739	100	2.91739		
Total (corrected)	767.681	179			
<i>P. dominula</i> - fennel					
Covariable					
Radiation	127.432	1	127.432	67.67	<0.0001
Main effect					
Temperature	126.645	64	1.97883	1.05	>0.05
Residuals	180.779	96	1.88312		
Total (corrected)	661.129	161			
<i>P. gallicus</i> - fennel					
Covariable					
Radiation	170.38	1	170.38	70.63	<0.0001
Main effect					
Temperature	328.193	114	2.87889	1.19	>0.05
Residuals	354.619	147	2.41237		
Total (corrected)	1057.96	262			

Figure S1. Temperature and radiation conditions during foraging of *Polistes dominula* and *Polistes gallicus* on lovage and fennel. T_a increased with radiation intensity.

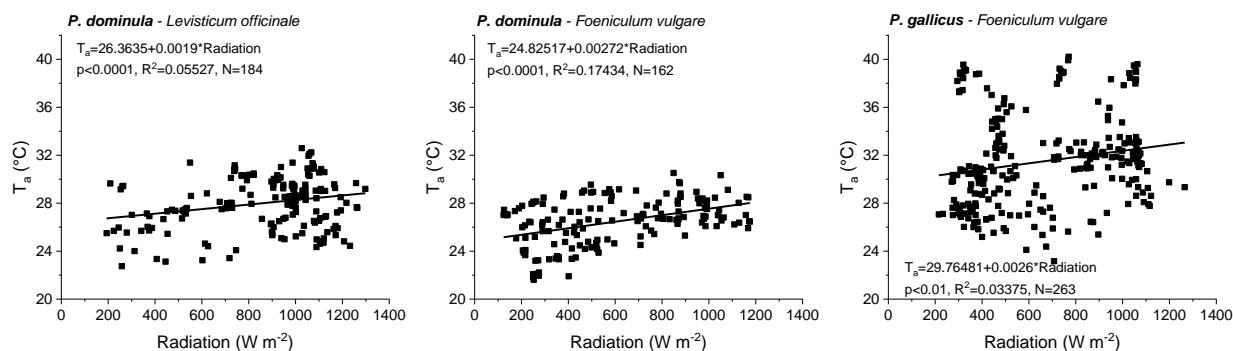


Figure S2. Thorax temperature excess of foraging *Polistes dominula* and *Polistes gallicus* on lovage and fennel for the different radiation categories.

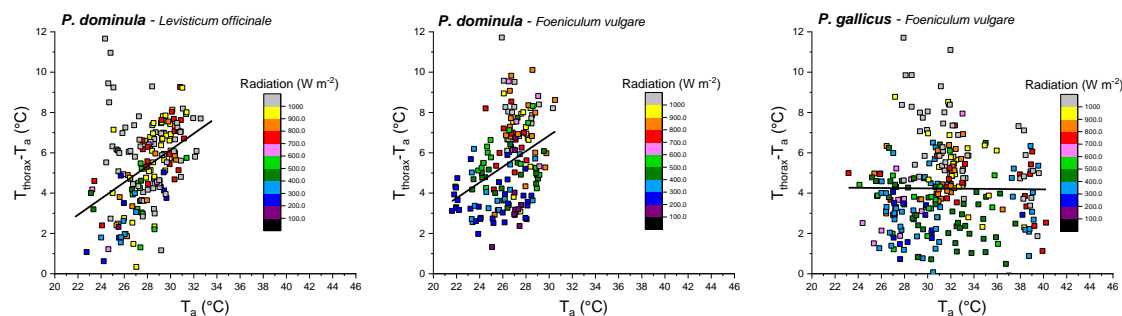


Figure S3. Thorax temperature excess of living (a) and dead (b) *Polistes dominula* and *Polistes gallicus* on lovage and fennel. A model calculation including both environmental parameters, i.e. $T_{th}-T_a = A + B1*T_a + B2* Radiation$, revealed that radiation contributed the main part to this temperature increase (Figure S3; Table S3). Black symbols represent measured values and red symbols represent the model results for radiation-corrected values. For statistical details see Supplementary Table S3.

