

SUPPORTING INFORMATION

Appendix S1. Composition of the study Acrididae community, number of individuals sampled and number of sites in which each species was found. Species represented by 1-8 individuals only were not considered in this study.

Species	Number of individuals	Number of sites
<i>Chorthippus binotatus</i>	14	5
<i>Chorthippus cazurroi</i>	405	24
<i>Chorthippus parallelus</i>	333	30
<i>Chorthippus yersini</i>	326	44
<i>Myrmeleotettix maculatus</i>	20	6
<i>Omocestus kaesneri</i>	113	18
<i>Podisma carpetana</i>	30	11
<i>Stenobothrus nigromaculatus</i>	17	2
<i>Stenobothrus stigmaticus</i>	128	21
<i>Oedipoda caerulea</i>	8	3
<i>Calliptamus barbarus</i>	1	1
<i>Omocestus haemorrhoidalis</i>	4	1
<i>Euchorthippus</i> spp.	2	2
<i>Gomphocerus rufus</i>	2	2

Appendix S2. Relative abundances (%) of *Chorthippus cazurroi*, *C. yersini* and *C. parallelus* along five elevational bands in the Cantabrian Mountains. Abundance data per species per elevational band were standardized to a common sampling effort (relative standardized abundance=number of individuals of species *i* sampled in the elevational band *j* × overall number of individuals sampled in the elevational band *j* / grand total of individuals sampled in the study area). Differences were tested by χ^2 goodness-of-fit tests. Symbols (+) and (-) indicate significantly more and fewer individuals than expected by chance, respectively.

Relative abundances (%) standardized for sampling effort			
Elevational band	<i>Chorthippus cazurroi</i> (N=405)	<i>Chorthippus yersini</i> (N=326)	<i>Chorthippus parallelus</i> (N=333)
900-1200 m	0.00 (-)	27.40 (+)	32.10 (+)
1201-1500 m	8.01 (-)	13.15	40.90 (+)
1501-1800 m	13.35 (-)	20.00	20.38
1801-2100 m	29.37 (+)	16.44	5.44 (-)
2101-2400 m	49.27 (+)	7.40 (-)	1.38 (-)
<i>Differences within species</i>			
χ^2	315.72	48.53	208.40
<i>P</i>	<0.001	<0.001	<0.001
<i>Differences among species: $\chi^2 = 468.69, P < 0.001$</i>			

Appendix S3. Slopes of regressions between body size measures, and their statistical difference from 1 (i.e. isometry), as tested by *t*-tests. Values significantly lower than 1 indicate hypoallometry and values significantly greater indicate hyperallometry. Morphological measures were \log_{10} -transformed, and body mass was cube root transformed. Sample size corresponds to the totality of sampled individuals (405 *C. cazurroi*, 333 *C. parallelus*, 326 *C. yersini*) in regressions between morphological measures, and to 24 *C. yersini*, 22 *C. parallelus* and 21 *C. cazurroi* in regressions of morphological measures on body mass.

<i>Chorthippus cazurroi</i>	Slope (<i>b</i>) ± SE	Difference from 1 (<i>t</i> -value)	<i>P</i> -value
Pronotal length vs. Hind femur length	1.02 ± 0.025	0.77	0.44
Hind femur length vs. Total body length	0.58 ± 0.02	20.18	<0.001
Pronotal length vs. Total body length	0.66 ± 0.02	15.29	<0.001
Pronotal length vs. Dry body weight	0.69 ± 0.08	3.72	0.0014
Hind femur length vs. Dry body weight	0.70 ± 0.06	4.96	<0.001
Total body length vs. Dry body weight	0.95 ± 0.08	0.58	0.57

<i>Chorthippus yersini</i>	Slope (<i>b</i>) ± SE	Difference from 1 (<i>t</i> -value)	<i>P</i> -value
Pronotal length vs. Hind femur length	1.00 ± 0.02	0.31	0.97
Hind femur length vs. Total body length	0.73 ± 0.02	11.90	<0.001
Pronotal length vs. Total body length	0.80 ± 0.02	8.24	<0.001
Pronotal length vs. Dry body weight	0.77 ± 0.09	2.37	0.028
Hind femur length vs. Dry body weight	0.72 ± 0.06	4.36	0.0003
Total body length vs. Dry body weight	0.90 ± 0.06	1.61	0.12

<i>Chorthippus parallelus</i>	Slope (<i>b</i>) ± SE	Difference from 1 (<i>t</i> -value)	<i>P</i> -value
Pronotal length vs. Hind femur length	1.14 ± 0.03	4.48	<0.001
Hind femur length vs. Total body length	0.51 ± 0.02	27.13	<0.001
Pronotal length vs. Total body length	0.67 ± 0.02	15.68	<0.001
Pronotal length vs. Dry body weight	0.65 ± 0.08	4.28	0.0004
Hind femur length vs. Dry body weight	0.60 ± 0.07	6.01	<0.001
Total body length vs. Dry body weight	0.98 ± 0.09	0.17	0.87

Appendix S4. Accession numbers of sequences deposited in the NCBI genbank database.

<u>Species</u>	<u>Accession number</u>
<i>Chorthippus cazurroi</i>	KC480248
<i>Chorthippus yersini</i>	KC480250
<i>Chorthippus binotatus</i>	KC480255
<i>Chorthippus parallelus</i>	KC480247
<i>Stenobothrus stigmaticus</i>	KC480254
<i>Stenobothrus nigromaculatus</i>	KC480252
<i>Omocestus kaestneri</i>	KC480249
<i>Myrmeleotettix maculatus</i>	KC480253
<i>Podisma carpetana</i>	KC480251

Appendix S5. List of models predicting body size variation in response to climatic variables in *Chorthippus cazurroi*, *C. yersini* and *C. parallelus*, as ranked on the basis of their AIC value. Models were built with a forward-backward selection process including those variables that significantly affected the response variables when entered alone. To minimize the potential for significance-by-chance the number of models was limited to 10. We considered as most probable those models accounting for the lowest AIC and separated by the other models by at least 4 AIC points. SEX=Sex factor; TM=Mean annual temperature; PR=Accumulated precipitation; R=Temperature range; SUN=Sun exposition.

Chorthippus cazurroi

Hind femur length	AIC
PR+PR ² +TM+SEX+TM×SEX	581
PR+TM+SEX+TM×SEX	643
R+TM+PR+SUN+SEX	650
TM+SEX	653
TM+SEX+TM×SEX	656
SUN+TM+SEX+SEX×TM	672
SUN+SEX	741
R+SEX	749
SUN+SEX+SUN×SEX	757
PR×SEX+SEX+PR	766
Total body length	AIC
PR+PR ² +TM+SEX+PR×SEX+PR ² ×SEX	1383
PR+PR ² +TM+SEX+TM×SEX	1392
TM+SEX+TM×SEX	1402
PR+SEX+TM+TM×SEX	1419
PR+SEX+TM+PR×SEX	1420
PR+R+TM+SUN+SEX	1425
PR+PR ² +SEX+PR×SEX+PR ² ×SEX	1427
PR+PR ² +SEX	1438
R+SEX+R×SEX	1455
SUN+SEX	1464

Chorthippus yersini

Hind femur length	AIC
SEX	589
TM+SEX	595
R+SEX	596
TM+SEX+TM×SEX	600
TM+R+SEX	600
R+SEX+R×SEX	601
SUN+SEX	605
PR+SEX	605
TM+SEX+SUN	609
PR+SEX+PR×SEX	621
Total body length	AIC
SUN+SEX	1226

TM+SEX	1228
SUN+TM+SEX	1229
TM+SEX+TM×SEX	1229
R+SEX+R×SEX	1230
SUN+TM+SEX+TM×SEX	1230
SUN+SEX+SUN×SEX	1238
TM+SUN+TM×SUN+SEX	1243
PR+R+TM+SUN+SEX	1247
PR×SEX	1250

Chorthippus parallelus

Hind femur length	AIC
TM+SEX	489
SEX	492
TM+SEX+TM×SEX	494
R+SEX	498
R+SEX+R×SEX	504
PR+SEX	507
SUN+SEX	508
R+TM+PR+SUN+SEX	522
SUN+SEX+SUN×SEX	523
SEX+PR +PR×SEX	523
Total body length	AIC
PR+PR ² +TM+SEX+TM×SEX	1010
SEX	1015
TM+SEX+TM×SEX	1018
PR+SEX	1027
PR+TM+SEX+TM×SEX	1028
SUN+SEX	1028
PR+SEX+PR×SEX	1039
SEX+PR+TM+PR×TM	1041
SUN+SEX+SUN×SEX	1044
PR+SUN+R+TM+SEX	1047

Appendix S6. Predicted trends of interspecific variation of hind femur length as a function of elevation, as estimated from phylogenetic generalized least squares regressions in females and males of the nine study species.

