

**APPENDIX A: Number of species and higher taxa from which each of the physiological variables was examined.**

**1. Cold hardiness**

Order	Family	Genus	Species
Blattodea	3	4	5
Coleoptera	27	115	151
Dermaptera	1	1	1
Diptera	19	41	84
Hemiptera	14	38	51
Hymenoptera	17	34	59
Isoptera	1	2	2
Lepidoptera	22	72	85
Mecoptera	1	1	2
Neuroptera	1	1	1
Orthoptera	4	17	19
Plecoptera	1	1	1
Siphonaptera	1	1	1
Thysanoptera	1	1	2
Total= 14	113	329	465

**2. Upper lethal temperature**

Order	Family	Genus	Species
Anoplura	1	1	1
Blattodea	4	10	14
Coleoptera	10	54	88
Dermaptera	1	1	1
Diptera	10	23	65
Hemiptera	7	11	11
Hymenoptera	10	37	85
Isoptera	3	7	10
Lepidoptera	9	16	19
Neuroptera	1	1	1
Odonata	1	1	1
Orthoptera	4	9	10
Siphonaptera	1	1	1
Total = 13	62	172	307

### 3. Desiccation resistance

Order	Family	Genus	Species
Blattodea	4	10	15
Coleoptera	15	117	191
Dermaptera	1	1	1
Diptera	12	14	30
Hemiptera	5	5	5
Hymenoptera	7	19	41
Isoptera	2	5	21
Lepidoptera	9	14	16
Orthoptera	8	33	40
Plecoptera	1	1	1
Siphonaptera	1	1	1
Thysanura	1	1	1
Total = 12	66	221	363

### 4. Development

Order	Family	Genus	Species
Blattodea	2	2	2
Coleoptera	21	84	132
Dermaptera	2	2	2
Diptera	22	72	116
Ephemeroptera	3	3	5
Hemiptera	19	65	90
Hymenoptera	18	65	89
Isoptera	1	1	1
Lepidoptera	26	82	113
Manitodea	1	1	1
Neuroptera	2	4	13
Odonata	1	1	3
Orthoptera	5	10	10
Plecoptera	4	6	7
Siphonaptera	1	2	2
Thysanoptera	2	3	5
Total = 16	125	401	591

## 5. Respiratory metabolism

Order	Family	Genus	Species
Blattodea	4	9	12
Coleoptera	25	155	206
Diptera	12	15	19
Hemiptera	12	32	36
Hymenoptera	6	30	70
Isoptera	4	43	68
Lepidoptera	18	47	58
Mantodea	1	1	1
Megaloptera	1	1	1
Neuroptera	1	2	2
Odonata	2	11	13
Orthoptera	6	30	42
Plecoptera	6	9	12
Total = 13	98	388	543

## 6. Thermoregulation

Order	Family	Genus	Species
Blattodea	2	2	2
Coleoptera	8	47	72
Diptera	10	26	42
Ephemeroptera	1	1	1
Hemiptera	1	3	5
Hymenoptera	9	25	59
Isoptera	1	1	1
Lepidoptera	17	63	104
Neuroptera	1	1	1
Odonata	7	28	42
Orthoptera	4	16	20
Total = 11	61	213	349

## 7. Summary of total number of species

Order	Family	Genus	Species
Anoplura	1	1	1
Blattodea	5	16	26
Coleoptera	42	362	605
Dermaptera	3	3	3
Diptera	30	118	259
Ephemeroptera	3	3	5
Hemiptera	29	116	163
Hymenoptera	31	146	337
Isoptera	5	47	85
Lepidoptera	40	187	281
Mantodea	1	3	3
Mecoptera	1	1	2
Megaloptera	1	1	1
Neuroptera	3	8	19
Odonata	7	30	46
Orthoptera	11	60	85
Plecoptera	6	13	19
Siphonaptera	2	3	3
Thysanoptera	2	3	6
Thysanura	1	1	1
Total = 20	224	1123	1948

## APPENDIX B: List of papers examined for the study.

### 1. Cold hardiness (lower lethal temperatures)

- Adedokun, T.A. & Delinger, D.L. 1984. Cold hardiness: a component of the diapause syndrome in pupae of the flesh flies, *Sarcophaga crassipalpis* and *S. bullata*. *Physiological Entomology* **9**, 361-364.
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- Alonso-Mejia, A. & Arellano-Guillermo, A. 1992. Influence of temperature, surface body moisture and height above ground of monarch butterflies overwintering in Mexico. *Biotropica* **24**, 415-419.
- Armbrust, E.J., White, C.E. & Dewitt, J.R. 1969. Lethal limits of low temperature for the alfalfa weevil in Illinois. *Journal of Economic Entomology* **62**, 464-467.
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- Atmowidjojo, A.H., Wheeler, D.E., Erickson, E.H. & Cohen, A.C. 1997. Temperature tolerance and water balance in feral and domestic honey bees, *Apis mellifera* L. *Comparative Biochemistry and Physiology* **118A**, 1399-1403.
- Bakke, A. 1969. Extremely low supercooling point in eggs of *Zeiraphera diniana* (Guenee) (Lepidoptera: Tortricidae). *Norwegian Journal of Entomology* **16**, 81-83.
- Bakken, H. 1985. Cold hardiness in the Alpine beetles *Patrobis septentrionis* and *Calathus melanocephalus*. *Journal of Insect Physiology* **31**, 447-453.
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- Bale, J.S., Harrington, R. & Clough, M.S. 1988. Low temperature mortality of the peach-potato aliphid *Myzus persicae*. *Ecological Entomology* **13**, 121-129.
- Bale, S.J. & Pullin, A.S. 1991. Opportunities and risks in the overwintering strategy of a wall-dwelling species of *Hypogastura* (Collembola). *Cryo-letters* **12**, 155-162.
- Bale, J.S., Singh, S.P., Jalali, S.K. & Kumar, P. 1989. Cold tolerance of cocoons of *Allorhogas pyralophagus* (Hymenoptera: Braconidae). *Entomophaga* **34**, 463-468.
- Bale, J.S., Strathdee, A.T. & Strathdee, F.C. 1994. Effects of low temperature on the arctic aphid *Acyrtosiphon brevicorne*. *Functional Ecology* **8**, 621-626.
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#### 4. Temperature dependence of development

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