

Table S.1 Ambient temperature shapes a suite of phenotypes in a diversity of parasite taxa

Phenotype	Parasite	Parasite Species	Host Species	Reference
parasite development	protozoan	<i>P. mexicanum</i>	<i>Lutzomyia vexator</i> (sand fly)	1
	viruses	nucleopolyhedrovirus	<i>Neodiprion sertifer</i> (saw fly)	2
	bacteria	<i>Serratia marcescens</i> , <i>Rickettsiella grylli</i>	<i>Acheta domesticus</i> (cricket)	3
		<i>Wolbachia</i>	<i>Nasonia vitripennis</i> , <i>Leptoplinina heterotoma</i> (wasps)	4, 5, 6
			<i>Drosophila simulans</i>	4
	fungi	<i>Metarhizium flavoviridae</i>	<i>Zonocerus variegatus</i> (grasshopper)	7
		<i>Beauveria bassiana</i>	<i>Anopheles arabiensis</i> (mosquito)	8
	microfilaria	<i>Wuchereria bancrofti</i>	<i>Aedes polynesiensis</i> (mosquito)	9
	parasitoids	<i>Gonatocerus morganii</i>	<i>Homalodisca vitripennis</i> (glassy-winged sharpshooter)	10
		<i>Psyllalia</i> spp.	<i>Bactrocera oleae</i> (fruit fly)	11
		<i>Telenomus remus</i>	<i>Spodoptera</i> spp. (moth)	12
host resistance	viruses	nucleopolyhedrovirus	<i>Trichogramma</i> spp.	13
		nucleopolyhedrovirus	<i>Heliothis virescens</i> (moth)	14
	bacteria	<i>Malacosoma californicum</i> (caterpillar)	<i>Bombyx mori</i> (silkworm)	15
		<i>Bacillus thuringiensis</i>	<i>Caenorhabditis elegans</i>	16
		<i>Providencia rettgeri</i> , <i>Pseudomonas aeruginosa</i> , <i>Lactococcus lactis</i>	<i>Drosophila melanogaster</i> (fruit fly)	17, 18
	fungi	<i>Wolbachia</i>	<i>Drosophila melanogaster</i> (fruit fly)	19
		<i>Pasteuria ramosa</i>	<i>Daphnia magna</i> (water flea)	20
		<i>Serratia marcescens</i>	<i>Gryllus texensis</i> (cricket)	21
	nematodes	<i>Entomophthora muscae</i>	<i>Musca domestica</i> (house fly)	22
		<i>Entomophaga grylli</i>	<i>Cannula pellucida</i> (grasshopper)	23
		<i>Erynia neoaphidis</i>	<i>Acyrtosiphon pisum</i> (pea aphid)	24
	<i>Steinernema</i> spp.		<i>Galeria mellonella</i> (moth), <i>Phyllophaga vetula</i> (moth), <i>Peridoroma saucia</i> (moth)	25, 26, 27
		<i>Heterorhabditis</i> spp.	<i>Galeria mellonella</i> (moth), <i>Phyllophaga vetula</i> (moth)	25, 26, 28

Phenotype	Parasite	Parasite Species	Host Species	Reference
Latency period	parasitoids	<i>Asobara tabida</i> , <i>Leptopilina boulardi</i> , <i>L. heterotoma</i>	<i>Drosophila melanogaster</i> (fruit fly)	29
		<i>Metaphyus stanleyi</i>	<i>Protopulvinaria pyriformis</i>	30
	mites	<i>Lestes forcipatus</i> (damselfly)	<i>Arrenurus planus</i> (mite)	31
	microsporidians	<i>Oligosporidium occidentalis</i>	<i>Metaseiulus occidentalis</i> (mite)	32
	fungi	<i>Metarhizium anisopliae</i> var <i>acridum</i>	<i>Schistocerca gregaria</i> (locust)	33
		<i>Beauveria bassiana</i>	<i>Dociostaurus maroccanus</i> (locust)	33
Transmission	bacteria	<i>Wolbachia</i>	<i>Exorista sorbillans</i> (Uzifly)	34
			<i>Drosophila</i> spp. (fruit fly)	4
			<i>Liposcelis tricolor</i> (psocid) <i>Tetranychus urticae</i> (spider mite)	35 36
			<i>Porcellionides pruinosus</i> (woodlouse)	37
	nematode	<i>Heterorhabditis</i> spp., <i>Steinernema</i> spp.	<i>Galleria mellonella</i> (moth), <i>Ceratitis capitata</i> (fruit fly)	28, 38, 39
	parasitoids	<i>Psyllalia</i> spp.	<i>Bactrocera oleae</i> (fruit fly)	11
		<i>Trichogramma</i> spp.	<i>Heliothis virescens</i> (moth)	13

Literature Cited

- 1 Fialho, R. F. & Schall, J. J. Thermal ecology of a malarial parasite and its insect vector - consequences for the parasites transmission success. *J. Anim. Ecol.* **64**, 553-562 (1995).
- 2 Mohamed, M. A., Coppel, H. C. & Podgwaite, J. D. Temperature and crowding effects on virus manifestation in *Neodiprion sertifer* (Hymenoptera: Diprionidae) larvae. *Gt. Lakes Entomol.* **18**, 115-118 (1985).
- 3 Adamo, S. A. The specificity of behavioral fever in the cricket *Acheta domesticus*. *J. Parasitol.* **84**, 529-533 (1998).
- 4 Clancy, D. J. & Hoffmann, A. A. Environmental effects on cytoplasmic incompatibility and bacterial load in *Wolbachia*-infected *Drosophila simulans*. *Entomol. Exp. Appl.* **86**, 13-24, doi:10.1046/j.1570-7458.1998.00261.x (1998).
- 5 Mouton, L., Henri, H., Charif, D., Bouletreau, M. & Vavre, F. Interaction between host genotype and environmental conditions affects bacterial density in *Wolbachia* symbiosis. *Biology Letters* **3**, 210-213, doi:10.1098/rsbl.2006.0590 (2007).

- 6 Bordenstein, S. R. & Bordenstein, S. R. Temperature affects the tripartite interactions between bacteriophage WO, *Wolbachia*, and cytoplasmic incompatibility. *Plos One* **6**, doi:e29106 10.1371/journal.pone.0029106 (2011).
- 7 Thomas, M. B. & Jenkins, N. E. Effects of temperature on growth of *Metarhizium flavoviride* and virulence to the variegated grasshopper, *Zonocerus variegatus*. *Mycol. Res.* **101**, 1469-1474 (1997).
- 8 Kikankie, C. K. *et al.* The infectivity of the entomopathogenic fungus *Beauveria bassiana* to insecticide-resistant and susceptible *Anopheles arabiensis* mosquitoes at two different temperatures. *Malaria Journal* **9**, 9, doi:71 10.1186/1475-2875-9-71 (2010).
- 9 Lardeux, F. & Cheffort, J. Temperature thresholds and statistical modelling of larval *Wuchereria bancrofti* (Filariidae: Onchocercidae) developmental rates. *Parasitology* **114**, 123-134, doi:10.1017/s0031182096008359 (1997).
- 10 Son, Y., Nadel, H., Baek, S., Johnson, M. W. & Morgan, D. J. W. Estimation of developmental parameters for adult emergence of *Gonatocerus morgani*, a novel egg parasitoid of the glassy-winged sharpshooter, and development of a degree-day model. *Biol. Control* **60**, 233-240, doi:10.1016/j.biocontrol.2011.04.008 (2012).
- 11 Wang, X. G., Levy, K., Son, Y., Johnson, M. W. & Daane, K. M. Comparison of the thermal performance between a population of the olive fruit fly and its co-adapted parasitoids. *Biol. Control* **60**, 247-254, doi:10.1016/j.biocontrol.2011.11.012 (2012).
- 12 Pomari, A. F., Bueno, A. D., Bueno, R. & Menezes, A. D. Biological characteristics and thermal requirements of the biological control agent *Telenomus remus* (Hymenoptera: Platygastriidae) reared on eggs of different species of the genus *Spodoptera* (Lepidoptera: Noctuidae). *Ann. Entomol. Soc. Am.* **105**, 73-81, doi:10.1603/an11115 (2012).
- 13 Andrade, G. S., Pratirossi, D., Dalvi, L. P., Desneux, N. & Goncalves dos Santos Junior, H. J. Performance of four *Trichogramma* species (Hymenoptera: Trichogrammatidae) as biocontrol agents of *Heliothis virescens* (Lepidoptera: Noctuidae) under various temperature regimes. *J. Pest Sci.* **84**, 313-320, doi:10.1007/s10340-011-0364-3 (2011).
- 14 Frid, L. & Myers, J. H. Thermal ecology of western tent caterpillars *Malacosoma californicum pluviale* and infection by nucleopolyhedrovirus. *Ecol. Entomol.* **27**, 665-673 (2002).
- 15 Kobayashi, M., Inagaki, S. & Kawase, S. Effect of high temperature on the development of nuclear polyhedrosis virus in the silkworm, *Bombyx mori*. *J. Invertebr. Pathol.* **38**, 386-394 (1981).
- 16 Schulenburg, H. & Muller, S. Natural variation in the response of *Caenorhabditis elegans* towards *Bacillus thuringiensis*. *Parasitology* **128**, 433-443, doi:10.1017/s003118200300461x (2004).
- 17 Lazzaro, B. P., Flores, H. A., Lorigan, J. G. & Yourth, C. P. Genotype-by-environment interactions and adaptation to local temperature affect immunity and fecundity in *Drosophila melanogaster*. *PLoS Pathogens* **4**, 1-9, doi:e1000025 10.1371/journal.ppat.1000025 (2008).
- 18 Linder, J. E., Owers, K. A. & Promislow, D. E. L. The effects of temperature on host-pathogen interactions in *D. melanogaster*: Who benefits? *J. Insect Physiol.* **54**, 297-308, doi:10.1016/j.jinsphys.2007.10.001 (2008).
- 19 Reynolds, K. T., Thomson, L. J. & Hoffmann, A. A. The effects of host age, host nuclear background and temperature on phenotypic effects of the virulent *Wolbachia* strain popcorn in *Drosophila melanogaster*. *Genetics* **164**, 1027-1034 (2003).

- 20 Mitchell, S. E., Rogers, E. S., Little, T. J. & Read, A. F. Host-parasite and genotype-by-environment interactions: temperature modifies potential for selection by a sterilizing pathogen. *Evolution* **59**, 70-80 (2005).
- 21 Adamo, S. A. & Lovett, M. M. E. Some like it hot: the effects of climate change on reproduction, immune function and disease resistance in the cricket *Gryllus texensis*. *J. Exp. Biol.* **214**, 1997-2004, doi:10.1242/jeb.056531 (2011).
- 22 Watson, D. W., Mullens, B. A. & Petersen, J. J. Behavioral fever response of *Musca domestica* (Diptera: Muscidae) to infection by *Entomophthora muscae* (Zygomycetes: Entomophthorales). *J. Invertebr. Pathol.* **61**, 10-16 (1993).
- 23 Carruthers, R. I., Larkin, T. S., Firstencel, H. & Feng, Z. D. Influence of thermal ecology on the mycosis of a rangeland grasshopper. *Ecology* **73**, 190-204 (1992).
- 24 Stacey, D. A. *et al.* Genotype and temperature influences pea aphid resistance to a fungal entomopathogen. *Physiol. Entomol.* **28**, 75-81 (2003).
- 25 Menti, H., Wright, D. J. & Perry, R. N. Infectivity of populations of the entomopathogenic nematodes *Steinernema feltiae* and *Heterorhabditis megidis* in relation to temperature, age, and lipid content. *Nematology* **2**, 515-521 (2000).
- 26 Ruiz-Vega, J., Ruiz-Carballo, F., Perez-Pacheco, R. & Martinez-Tomas, S. H. Improvement of heat and desiccation tolerance of three entomopathogenic nematodes. *Nematropica* **41**, 264-270 (2011).
- 27 Yoshida, M. Influence of temperature on pathogenicity of some entomopathogenic nematode isolates (*Steinernema* spp.) from Japan screened for ability to control some noctuid moth larvae. *Nematological Research* **40**, 27-40 (2010).
- 28 Chung, H. J. *et al.* Temperature and dose effects on the pathogenicity and reproduction of two Korean isolates of *Heterorhabditis bacteriophora* (Nematoda: Heterorhabditidae). *J. Asia Pac. Entomol.* **13**, 277-282, doi:10.1016/j.aspen.2010.05.007 (2010).
- 29 Fellowes, M. D. E., Kraaijeveld, A. R. & Godfray, H. C. J. Cross-resistance following artificial selection for increased defense against parasitoids in *Drosophila melanogaster*. *Evolution* **53**, 966-972 (1999).
- 30 Blumberg, D. Seasonal variations in the encapsulation of eggs of the encyrtid parasitoid *Metaphyus stanleyi* by the pyriform scale, *Protopulvinaria pyriformis*. *Entomol. Exp. Appl.* **58**, 231-237 (1991).
- 31 Olsen, L. E. & Hoy, M. A. Heat curing *Metaseiulus occidentalis* (Nesbitt) (Acari, Phytoseiidae) of a fitness-reducing microsporidium. *J. Invertebr. Pathol.* **79**, 173-178 (2002).
- 32 Blanford, S. & Thomas, M. B. Thermal behavior of two acridid species: effects of habitat and season on body temperature and the potential impact of biocontrol with pathogens. *Environ. Entomol.* **29**, 1060-1069 (2000).
- 33 Guruprasad, N. M., Mouton, L. & Puttaraju, H. P. Effect of *Wolbachia* infection and temperature variations on the fecundity of the Uzifly *Exorista sorbillans* (Diptera: Tachinidae). *Symbiosis* **54**, 151-158, doi:10.1007/s13199-011-0138-y (2011).
- 34 Hurst, G. D. D., Jiggins, F. M. & Robinson, S. J. W. What causes inefficient transmission of male-killing *Wolbachia* in *Drosophila*? *Heredity* **87**, 220-226, doi:10.1046/j.1365-2540.2001.00917.x (2001).

- 35 Montenegro, H. & Klaczko, L. B. Low temperature cure of a male killing agent in *Drosophila melanogaster*. *J. Invertebr. Pathol.* **86**, 50-51, doi:10.1016/j.jip.2004.03.004 (2004).
- 36 Van Opijnen, T. & Breeuwer, J. A. J. High temperatures eliminate *Wolbachia*, a cytoplasmic incompatibility inducing endosymbiont, from the two-spotted spider mite. *Experimental and Applied Acarology* **23**, 871-881, doi:10.1023/a:1006363604916 (1999).
- 37 Rigaud, T., Antoine, D., Marcade, I. & Juchault, P. The effect of temperature on sex ratio in the isopod *Porcellionides pruinosis*: Environmental sex determination or a by-product of cytoplasmic sex determination? *Evol. Ecol.* **11**, 205-215, doi:10.1023/a:1018404000804 (1997).
- 38 Mukuka, J., Strauch, O., Al Zainab, M. H. & Ehlers, R. U. Effect of temperature and desiccation stress on infectivity of stress tolerant hybrid strains of *Heterorhabditis bacteriophora*. *Russian Journal of Nematology* **18**, 111-116 (2010).
- 39 Rohde, C., Moino, A., da Silva, M. A. T., Carvalho, F. D. & Ferreira, C. S. Influence of soil temperature and moisture on the infectivity of entomopathogenic nematodes (Rhabditida: Heterorhabditidae, Steinemematidae) against larvae of *Ceratitis capitata* (Wiedemann) (Diptera: Tephritidae). *Neotrop. Entomol.* **39**, 608-611, doi:10.1590/s1519-566x2010000400022 (2010).