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PARASITES OF THE GERMAN COCKROACH *BLATTELLA GERMANICA* AND THEIR INFLUENCE ON HOST FITNESS

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The German cockroach (*Blattella germanica*) is host for several parasites. Due to the high population density in laboratory cultures of cockroaches, transmission rates of parasites as well as parasite prevalence can also be high. Cockroaches are important test organisms for efficacy testing of insecticides, and therefore we compared the fitness of parasitized and non-parasitized cockroach strains under laboratory conditions. We identified *Nephridiophaga blattellae* (unicellular Zygomycete), *Gregarina blattarum* (Apicomplexa), *Balantidium sp.* (Ciliata) and *Blatticola blattae* (Nematoda) as common parasites in laboratory cockroach cultures. To obtain parasite-free cockroach strains, oothecae from *Blattella germanica* were submersed for 2 s in 70% ethanol, and were washed in sodium hypochlorite and subsequently in sodium thiosulfate for 210 s each and then transferred to a quarantine culture. Parasitized cockroaches have a lower reproduction rate (1 ootheca less in average compared with parasite-free cockroaches, parasite-free n = 62, parasitized n = 48), and a higher juvenile mortality. 10% of the parasitized (n=217) and only 3 % of the parasite-free cockroaches (n=227) did not develop into adults. Adult mortality was also higher in parasitized cockroaches, 28 % of the parasitized adult cockroaches (n=119) compared to 9% of the parasite-free adult cockroaches died within 135 d after their last ecdysis. However, parasitized and parasite-free cockroaches did not differ in their metabolic rates. At an ambient temperature (T_A) of 30 °C, parasitized cockroaches had a metabolic rate of 4.49 mW/g (standard deviation SD ± 0.44 mW/g, n = 10) compared to 4.24 mW/g (standard deviation SD ± 0.81 mW/g, n = 10; difference not significant, two-sample t-test 0.39>0.05). The same difference was observed at T_A 35 °C (parasitized: 5.92 mW/g, SD ± 0.44 mW/g, parasite-free: 5.79 mW/g SD ± 0.84 mW/g, both n = 10; difference not significant, two-sample t-test 0.66>0.05). Cockroaches from infested objects in the area of Berlin (Zoological garden, Chinese take-away restaurant) had lower parasite prevalence than cockroaches from laboratory cultures (Federal Environment Agency, Berlin and Central Institute of Medical Service of the Federal Armed Forces, Konstanz). No gregarines or ciliates were found in cockroaches from infested objects, and in 2 of 3 cases also no *Nephridiophaga*, whereas 3 of 4 laboratory strains had gregarines as well as ciliates. The only parasite found both in free-living and laboratory cockroaches was the nematode *Blatticola blattae*.
Our results emphasize the importance of quality management in laboratory cockroach cultures for testing purposes.

Key Words *Blattella germanica, Nephridiophaga blattellae, Gregarina blattarum, Blatticola blattae*