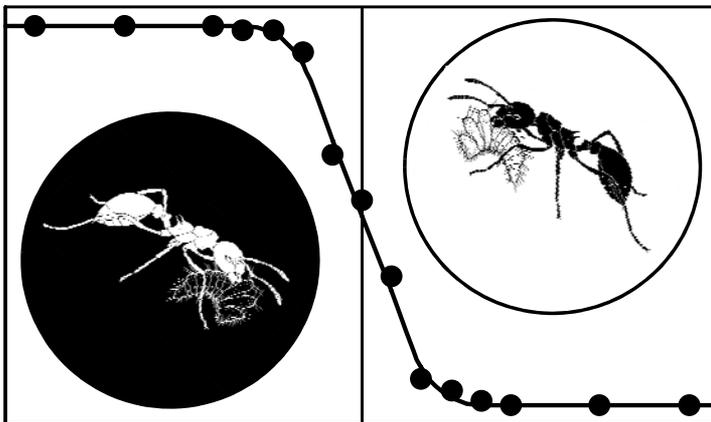


IVth European Workshop of Invertebrate Ecophysiology

St. Petersburg, Russia, 9 – 15 September 2001

ABSTRACTS

Edited by Vladilen E. Kipyatkov



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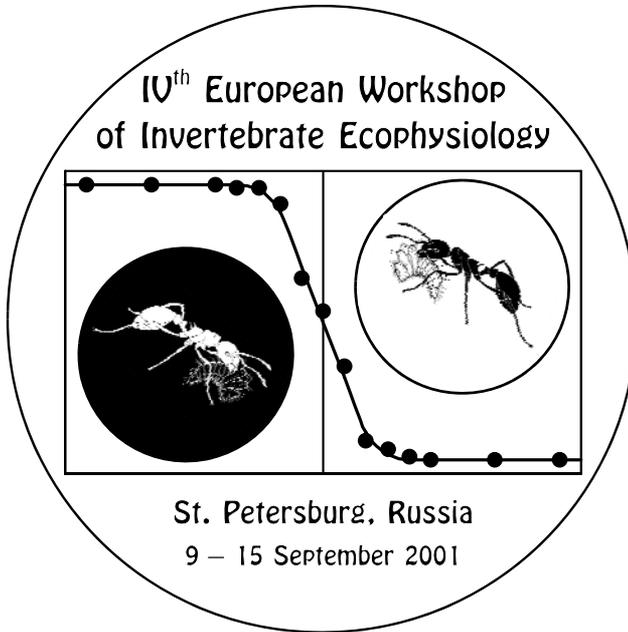
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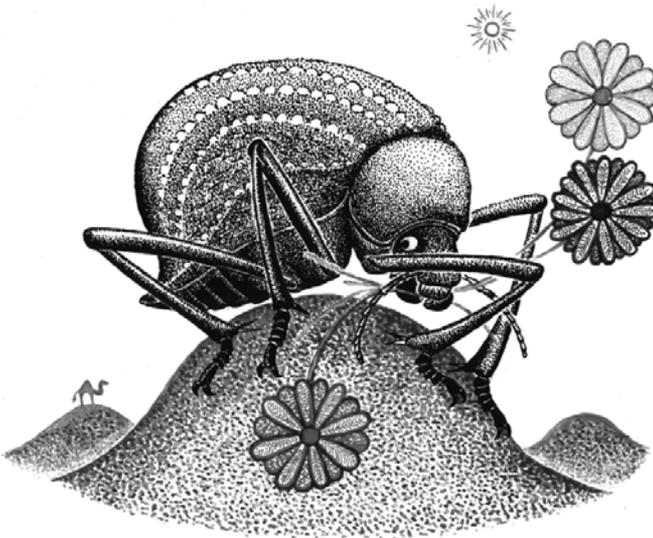
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Dedicated to the memory of
Prof. Alexander S. Danilevsky
(1911 – 1969)

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Drawing by N. Yu. Kluge

Impact of exposure of *Coccinella septempunctata* L. (Col., Coccinellidae) to extreme temperatures on their life cycles

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Analysis of data shows that temperature impact on the physiological processes of *Coccinellidae* has been studied fairly well for temperatures close to optimum and relatively insufficiently for extreme temperatures. It is for this reason that we conducted a study of how extreme temperatures affect discrete stages of the life cycles in *Coccinellidae* (*Coccinella septempunctata*).

The *Coccinellidae* selected for our experiment at the end of their vegetation period fed on artificial food under laboratory conditions precluding the diapause. In April (the time when *Coccinellidae* come out of the diapause under natural conditions) the experimental beetles switched to feeding on aphids (*Aphis pomi* Deg.) and were subjected for an hour to an extreme temperature 44°C RH 60%. Beetles of the control group were taken from their wintering grounds after they had come out of the diapause at the end of April and were kept like the experimental beetles under optimum conditions of 22–24°C RH 50%.

It was observed that experimental *Coccinellidae* mated 3 days earlier than those of the control group. However, their oviposition began 17 days earlier. The fertility of an experimental female beetle as compared to one of the control group decreased on average by one third. During experimentation mortality reached 27%, and in the control group it amounted to 21%. The cycle of life of the experimental beetles was 3 to 7 days shorter than that in the control group.

Then the experimental beetles of the first generation were kept under three sets of conditions: the first group (OK₁) was kept at a temperature of 30°C RH 50% without exposure to extreme temperature, the second group (OK₂) was kept at temperatures 22–34°C RH 50–60% and was exposed to extreme temperature of 44°C for 15 minutes, and the third group (OK₃) was kept at a temperature of 30°C RH 50% and was exposed to extreme temperature of 44°C for one hour. The experimental beetles and those of the control group had the same food regimen. Oviposition in both groups occurred at the same time. The average fertility of the female beetles of OK₁, OK₂ and OK₃ was 791, 542 and 157 eggs respectively, and that in the control group was 300 eggs with 30, 50, 72 and 34% of all eggs lost respectively. Oviposition in OK₁, OK₂ and OK₃ lasted for 25, 17 and 11 days respectively, and that in the control group lasted for up to 45 days. The gas exchange of the imago and larvae of the III–IV ages (OK₁) was higher than that of the imago (OK₂) and larvae of the III–IV ages. The cycle of life of the *Coccinella septempunctata* of the second generation under different conditions ranged between 17 and 20 days.

Conclusion: exposure of *Coccinellidae* to extreme temperatures in certain conditions they are kept under is stimulatory to the development of *Coccinellidae* of the second generation, whereas recurrent exposure of *Coccinellidae* of this generation to extreme temperatures oppresses their activity at the various stages of their development.

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