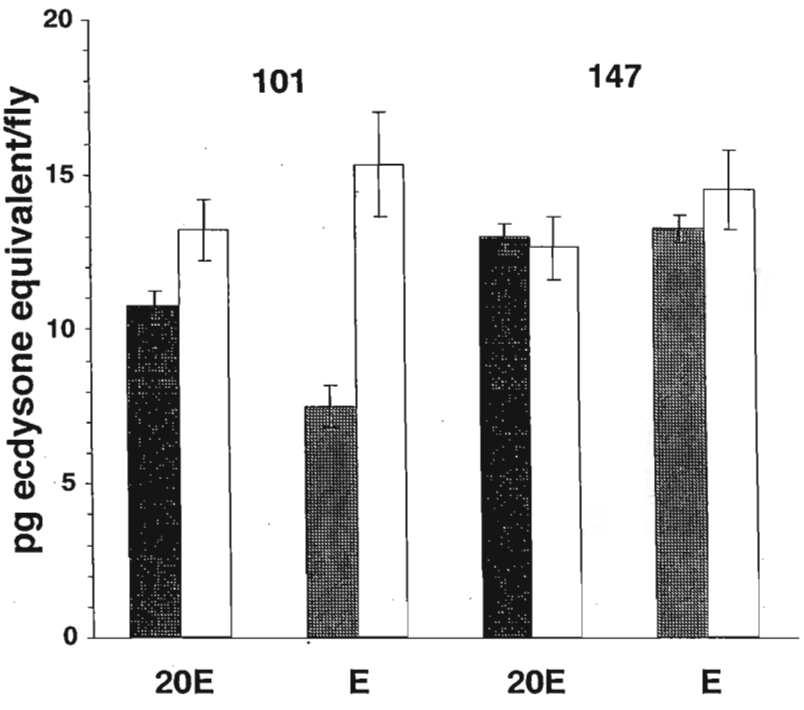
and R.A. Morton 1992, J. Genetics 71: 121-134; Windelspecht, M., A.C. Richmond, and B.J. Cochrane 1998, J. Econ. Ent. 91: 1245-1252; Wratten, S.D., H. Wearing, D. King, and S. Davis 1998, Proc. 6th Australasian Appl. Entomological Res. Conf., pp 153-159; Wratten, S.D., M. Hofmans, S. Thomsen, P. Williams, G. Groves, C. Eason, and J. Greer 1997, Proc. 50th New Zealand Plant Protection Conf., pp 514-519.

The system of ecdysteroids is a component of the stress-reaction in *Drosophila* adults.

Sukhanova[2], M. Jh., A. Hirashima[1*], E. Suetsugu[1], E. Kuwano[1], and I. Yu. Rauschenbach[2]. [1]Division of Bioresource and Bioenvironmental Sciences, Kyushu University, Fukuoka 812-8581, Japan. [2]Institute of Cytology and Genetics, Siberian Branch of Russian Academy of Sciences, Novosibirsk 630090, Russia. *author of correspondence, e-mail: ahirasim@agr.kyushu-u.ac.jp.

In order to study the mechanism of the insect stress reaction we have created the model that consists of two lines of *Drosophila virilis* contrasting in their reaction to stressor effects. Individuals of wild type line 101 respond to stressors (high temperature, crowded culture, insufficient diet, mechanical and chemical stimuli) by a stress-reaction enabling them to adapt to unfavorable environmental conditions. Mutant flies of line 147 do not possess this response (Rauschenbach *et al.*, 1991). We have revealed the main components of the stress reaction in adults: the systems of juvenile hormone, dopamine and octopamine (Rauschenbach *et al.*, 1993, 1995; Hirashima *et al.*, 1999). We study here whether a system of ecdysteroids is a component of the reaction.



Cultures were raised on standard medium at 25°C and adults were synchronized by eclosion. Adults (24-h old) were subjected to stress by placing them at 38°C for 60 min. Thereafter they were frozen in liquid nitrogen and stored at –85°C. Contents of ecdysone (E) and 20-hydroxyecdysone (20HE) were measured by radio-immunoassay according to Chang and O'Connor (1979).

Figure 1. The contents of E and 20HE in 24-h old females of lines 101 and 147 under normal (25°C) and heat stress (38°C, 60 min) conditions. Closed bars - control, open bars - stress.

The contents of E and 20HE in females of lines 101 and 147 (Figure 1) under normal conditions demonstrate that there are differences between lines 101 and 147 in levels of the ecdysteroids. In mutant (line 147) females, both compounds are considerably higher than in wild type ones (differences are significant at $P < 0.001$ for E, and $P < 0.01$ for 20HE).

It is also clear that in wild type females (line 101) under stress both ecdysteroids increase (differences from the control are significant at $P < 0.01$ for 20HE and $P < 0.001$ for E). In mutant females under stress, the levels of E and 20HE do not change. Thus, the system of ecdysteroids is one of the components of stress-reaction in *Drosophila*.

Acknowledgments: This work was supported by a grant from the Goho Life Science International Fund: in part by a Grant-in-Aid for Scientific Research from the Ministry of Education, Science and Culture of Japan and by a grant from the Russian Fund of Fundamental Research.

References: Chang, E.S. and J.D. O'Connor 1979, In: *Methods of Hormone Radioimmunoassay*, Academic Press, New York, pp.797-814; Hirashima, A., M.Jh. Sukhanova, E. Kuwano and I.Yu. Rauschenbach 1999, Dros. Inf. Serv. 82:30-31; Rauschenbach, I.Yu, 1991, In: *Hormones and Metabolism in Insect Stress*, CRC Press, Boca Raton, pp.115-148; Rauschenbach, I.Yu., T.M. Khlebodarova, N.A. Chentosova, N.E. Gruntenko, L.G. Grenback, E.I. Yantsen and M.L. Filipenko 1995, J. Insect Physiol. 41:179-189; Rauschenbach, I.Yu., L.I. Serova, I.S. Timochina, N.A. Chentosa and L.V. Schumnaja 1993, J. Insect Physiol. 39:761-767.

Heat induced male sterility in *Drosophila buzzatii*: Genetic variation among populations for the duration of sterility.

Kærsgaard, Christina Weidick, Jeanette Vollmer, Jesper Dahlgaard, and Volker Loeschcke. Department of Ecology and Genetics, University of Aarhus, Ny Munkegade, Build. 540, DK-8000 Aarhus C, Denmark. Email:jesper.dahlgaard@biology.au.dk

Spermatogenesis in *Drosophila* males is blocked at or above 30°C and below 13°C, and causes males to be sterile, but a return to 25°C restores fertility within some days (David *et al.*, 1983). The narrow temperature interval that constitutes the limit between fertility and sterility is apparently fixed at a very specific temperature (David *et al.*, 1983). Attempts to push the threshold for temperature-induced sterility by artificial selection have not been successful (David pers. comm.).

When temperatures that cause male sterility are increased further, the duration of sterility is prolonged (David pers. comm.). This correlation between the stressfulness of the environment and the duration of sterility may imply that the latter can be genetically variable because thermal adaptation is common in *Drosophila* and because different populations experience high temperatures as more or less stressful.

The aim of the present study was to examine if genetic variation for the duration of heat induced sterility is present among populations despite a lack of variation in the temperature threshold for heat induced sterility. Three different populations of *Drosophila buzzatii* from Catamarca and Tilcara in Argentina and Tenerife in Spain were used. Development from larvae to adult was allowed at two different thermal regimes: 25°C and 31°C.

Seven days-old flies from all populations were put in separate bottles for egg laying at 25°C. The flies were transferred to new bottles after 24h to obtain enough flies for the experiment. Two days after the beginning of oviposition, bottles were placed in the two temperature chambers. As flies exposed to different heat treatments did not hatch at the same time, new bottles were set up to ensure