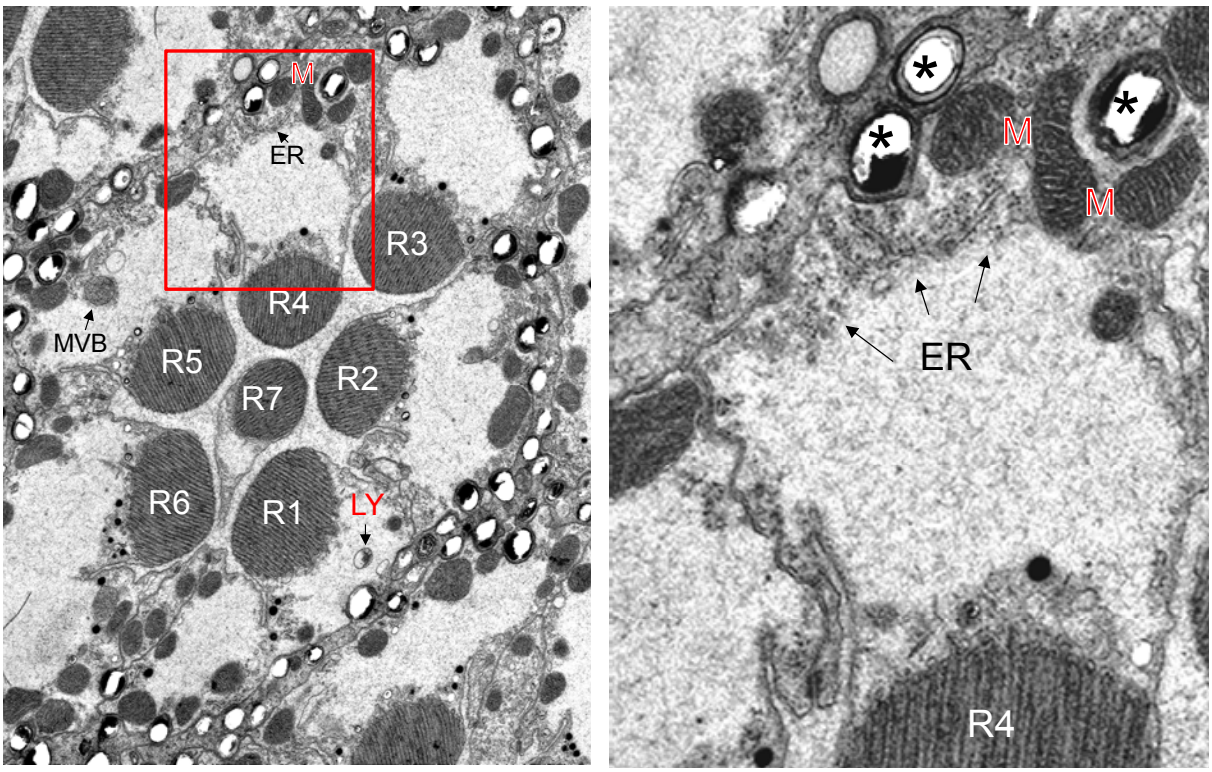

Figure 3. A healthy ommatidium with normal morphology from an alternative source of wild-type Canton-S flies (obtained from Howard Nash, NIMH, Bethesda, MD). On the right side panel the cytoplasm of R4 photoreceptor cell is shown at higher magnification. Note the relatively clean, uncluttered appearance of the cytoplasm, with the endoplasmic reticulum (ER, arrows) and a few mitochondria (M) near the cell border. * indicates the pigment granules; these often fall out during thin sectioning, hence the empty appearance of these structures.

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Growth temperature, duration of development, preadult viability, and body size in *Drosophila melanogaster*.

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Temperature is one of the most important environmental factors that influences all biological processes in *Drosophila*, from molecular level up to behavior (David *et al.*, 1983). Beside immediate influences, temperature may have delayed effects, which can express in later stages during life. For instance, many quantitative morphological traits of *Drosophila* adults depend on temperature at which they were exposed during the larval and/or pupal stage (David and Clavel, 1967), *e.g.*, low temperature, as a rule, influences slower developmental time and larger adult body size (Atkinson, 1994; French *et al.*, 1998; Gibert *et al.*, 2004).

The present study examined the effects of two growth temperatures (18°C and 25°C) on duration of development, preadult viability, and body size in *D. melanogaster*.

Table 1. Mean preadult viability of *D. melanogaster* flies reared at two growth temperatures, 18°C and 25°C.

Temperature	N	$\overline{X} \pm SE$
18°C	42	0.89 ± 0.02
25°C	42	0.91 ± 0.02

Table 2. Mean duration of development (males and females) of *D. melanogaster* at two growth temperatures, 18°C and 25°C.

Temperature	N	$\overline{X} \pm SE$
18°C	992	18.22 ± 0.06
25°C	1062	10.39 ± 0.04

Table 3. Mean wing length of males and females reared at different growth temperatures, 18°C and 25°C ; 1 mm ≈ 71 measurement units.

Temperature	N	$\overline{X} \pm SE$	t	df	P
18°C males	210	115.53 ± 0.18	49.63	418	<< 0.001
25°C males	210	103.62 ± 0.18			
18°C females	210	130.34 ± 0.24	44.93	418	<< 0.001
25°C females	210	118.81 ± 0.22			

Flies used in this experiment belonged to F_{59} laboratory generation of *D. melanogaster* flies from *BGSK* strain. This strain was originated by mixing samples from natural populations collected in Belgrade, Sremska Kamenica and Kragujevac, Serbia. Flies were maintained in mass culture, in 250 ccm glass bottles, without competition, at 25°C, relative humidity of 60%, and light conditions 12h L: 12h D, light from 8 a.m. to 8 p.m. During first 40 generations, flies were maintained on standard cornmeal-agar-yeast medium; later, their rearing was continued on yeast's substrate (dry baker's yeast -sucrose - water - agar - nipagin).

From F_{58} generation, virgin males and females were randomly taken. When they were six days old, males and females were crossed: every male stayed with two females for 24 hours; later, every female was transferred into separate flacon with fresh yeast's substrate, at 25°C. When female laid between 20 and 30 eggs (which was controlled several times during the day), she was transferred into new flacon with fresh medium. In total, there were 42 females: every female laid eggs in two flacons, one was put at 25°C, and the other one at 18°C (those flacons stayed during the first 24 hours also at 25°C during egg laying).

Viability is a major component of preadult fitness, and it is usually defined as the proportion of laid eggs which reach the adult stage. It is itself a combination of three components: egg hatchability, larval viability, and pupal viability (David *et al*., 2004). At both temperatures, preadult viability was about 90% (Table 1).

So high viability is not unexpected, as both temperatures are very close to the species optimum (David *et al.*, 1983).

Duration of development (time from egg laying up to adult eclosion) in *D. melanogaster* highly depends on temperature (Pétavy *et al*., 2001). As in our experiment differences in age of the laid eggs in the same flacon might be from several up to almost 24 hours, estimated duration of development (in days), presented on Table 2, are not precise, but it is obvious that development at 25°C is almost doubly faster.

Adult body size was estimated as right wing length (Table 3), as lenght of the third longitudinal vein, from the anterior cross vein to the distal edge (Partridge *et al.*, 1987).

Flies reared at 18°C were about 10% larger than flies of the corresponding sex reared at 25°C, and this diffrence, estimated by t-test, was highly statistically significant.

Effects of growth temperature on traits that we have observed are consistent with literature data, while some deviations, always present when comparing different populations and/or different samples are consequences of the genetic differences between those populations (see *e.g.*, Trotta *et al.*, 2006), as well as specific interactions among environmental conditions, genetic basis and experimental design. Using the *BGSK* strain, we intend to observe effect of growth temperature also on some other, less investigated phenotypic characteristics, especially on some behavioral traits.

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Growth temperature, mating latency, and duration of copulation in *Drosophila melanogaster*.

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For ectotherm species, such as *Drosophila*, temperature is one of the crucial environmental factors (David *et al.*, 1983; Precht *et al.*, 1955). Many papers considering influence of temperature on *Drosophila* geographic distribution, their adaptation on local thermal regimes, on phenotypic plasticity, as well as on different processes in all developmental stages were published (see *e.g.*, Anderson, 1973; James and Partridge, 1995; Hoffmann *et al.*, 2003; David *et al.*, 2004; Ayrinhac *et al.*, 2004; Trotta *et al.*, 2006). Delayed effects of growth temperature (temperature at which development occurs, from egg laying up to eclosion) on different phenotypic traits of adults are especially interesting (David *et al.*, 1983; Atkinson, 1994; French *et al.*, 1998). However, very little is known about delayed effect of growth temperature on behavior of *Drosophila* adults.

The present study examined the effect of two different growth temperatures (18°C and 25°C) on two components of mating behavior: *mating latency* (time between introduction of females and males into mating vial until inception of copulation) and *duration of copulation* (time from inception to the termination of copulation). Mating latency is an important component of fitness in *Drosophila* (Prakash, 1967) and is correlated with different fitness components, like fecundity, fertility and longevity (Hegde and Krishna, 1999; see also Rose *et al.*, 2004). Duration of copulation is primarily under genetic control, but may be affected by different factors, like previous mating experience (Singh and Singh, 2004; Pavković-Lučić and Kekić, 2006).