During differentiation of alkali magma in a closed chamber, magmatic pressure increases owing to concentration of volatiles, immediately over magmatic column and therefore, crystallization takes place under increasingly high pressure conditions. In contrast, crystallization under an open system or during the course of upward migration of a magma causes decreasing trend of magmatic pressure in the residual magma. Under such conditions, low pressure cpx may crystallize. In a closed system, highly Ca-rich cpx are unstable under high P_{CO_2} and they dissociate into calcites, dolomites and some other silicates. Crystallization of melilite instead of Ca-rich cpx may result from magma rich in CO_2. But under high pressure plutonic conditions, melilites are unstable[2]. Therefore, Ca-rich cpx dissociate into carbonate liquid and a silicate liquid under high P_{CO_2} and t^o_c conditions. At lower temperatures, a carbonatite magma immiscibly separates out from an alkali silicate magma. On further differentiation of these secondary magmas, comagmatic syenites and carbonatites might be produced. The chemistry and differentiation of Ca-rich cpx from shonkinite seem to link the differentiation trends of ultramafics and syenites and this feature suggests that the parental magma might be of alkali basaltic composition of shonkinitic type from which carbonatitic and alkali syenitic magmas were separated immiscibly at late magmatic stages under high t^o_c and P_{CO_2} conditions.

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CATALASE ACTIVITY DURING AGEING OF *ZAPRIONUS PARAVITTIGER* (DIPTERA: DROSOPHILIDAE)

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THE free radical-induced damage is commonly argued to be the major cause underlying the senescence-related deterioration of body structure and function[1,2]. Living systems have evolved self-defensive measures, such as antioxidants and anti-oxidizing enzyme systems[3], to limit the free radical initiated damage to tolerable levels[4]. Catalase (E.C. 1.11.1.6)—a member of antioxidizing enzyme system, is a heme containing enzyme involved in the metabolism of hydrogen peroxide[5]. The present study delineates the changes in catalase activity in the whole body homogenates of ageing male and female *Zaprionus paravittiger*.

The flies were reared on corn meal agar medium[6] at 26 ± 2°C. Freshly emerging flies were collected at every 24 hr intervals and were transferred to the fresh medium on every 12th day. Age-wise cultures were maintained for 57 days. The mean and the maximum life span is 35 and 70 days for males and 40 and 77 days for females, respectively[7]. Quantitative estimation of catalase was carried out by the method of Aebi[8]. Homogenate (2%, w/v) was prepared by homogenizing 20 mg of the tissue (about 4–5 flies) in 1.0 ml of 50 mM phosphate buffer (pH 7.0). One ml of supernatant obtained after centrifugation of homogenate at 12,000 rpm for 15 min at 4°C, was added to a mixture of phosphate buffer—50 mM, pH 7.0 (1 ml)—and sodium perborate solution—100 mM, pH 7.0 (3 ml)—preincubated at 20°C for 10 min. The reaction was stopped by the addition of sulphuric acid—2 N (3 ml) after 5 min (for stable reading). The remaining perborate was back-titrated with

permanganate solution (0.05 M). A standard curve was prepared by performing the assay with standard catalase obtained from bovine liver (Sigma Chemical Co., U.S.A.) containing 2.9 units per mg, where 1 unit decomposes 1.0 ml of H_2O_2/min at pH 7.0 at 22°C. Significance of the results was tested by applying two-tailed students *t* test.

Females of *Z. paravittiger* exhibited higher catalase activity at most of the age intervals studied as compared to the males (figure 1). This reflects that males are less capable of counteracting the deleterious effects of H_2O_2 and this may account for their shorter life span in comparison with that of the females[7]. The results support the view that longevity and efficiency of antioxidizing enzyme system are linked[9,10]. Females show a sharp decrease in catalase activity during the first 9 days of survival (twice as compared with the males) (figure 2). This may be due to the reproductive cost. The increase reported during 9 to 21 days of female also signifies the differential rate of growth and maturation of the two sexes. However, the reproductive period (9 to 21 days) is well marked by increasing catalase activity in both the sexes. This might partially compensate for the high metabolic rate and consequent damage associated with reproduction. The decrease in activity during post-maturational survival was interrupted by intermittent leaps (two in females and one in males) which might be referred to as an adaptive increase in response to the increased disintegration of the system. The study reveals that catalase and longevity are linked in *Z. paravittiger*.

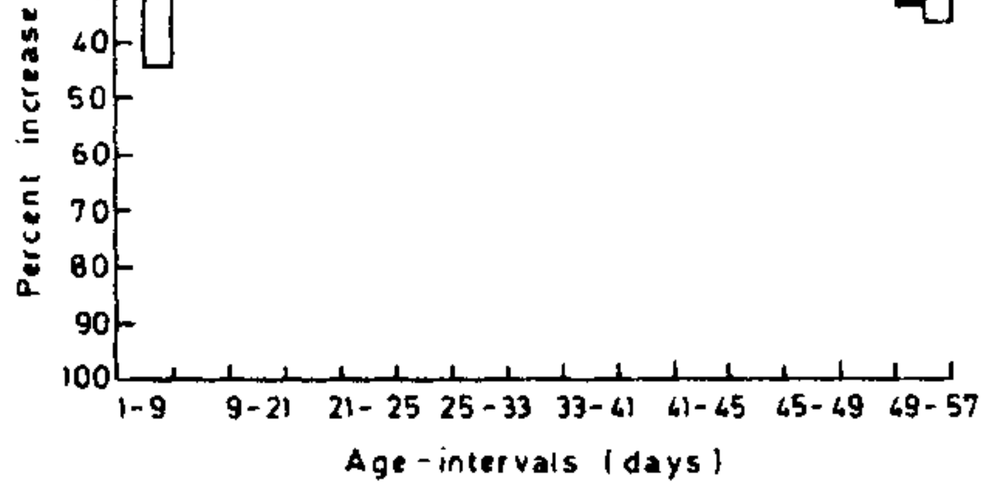

Figure 2. Per cent increase/decrease in catalase activity during different age-intervals in ageing *Z. paravittiger*.

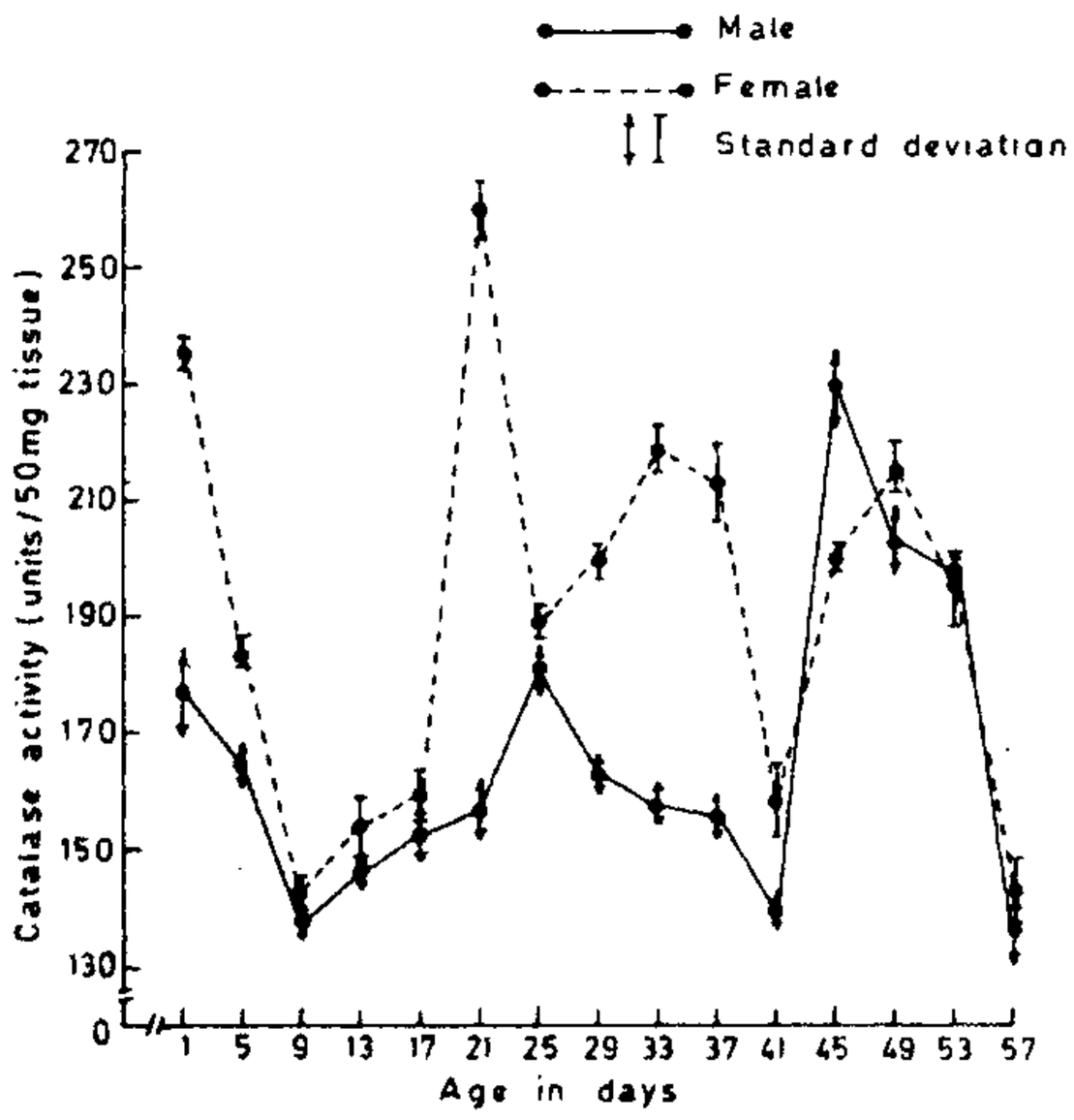

Figure 1. Age-related changes in catalase activity in *Z. paravittiger*.

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