mutagenicity of diethylnitrosamine. Angus *et al*[18] reported that certain triarylmethane dyes used as food colouring agents, and which are mutagenic in the *Salmonella* test, show much higher levels of mutagenicity when fed to *Drosophila* larvae than when fed or injected into adult males. In general, it can be concluded that larval stages are often more sensitive than adults for screening purposes.

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ACCUMULATION OF B-CHROMOSOMES IN *DROSOPHILA NASUTA ALBOMICANA*

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Drosophila is a potent eukaryotic system to explore many facets of population cytogenetics of chromosomal variability. Despite extensive studies on the chromosomes of *Drosophila*, B-chromosomes in *Drosophila* have been reported only recently[1,2]. The present note reports preliminary studies on B-chromosomes of *Drosophila nasuta albomicana*.

D. n. albomicana is most advanced in the *nasuta* subgroup of the *immigrans* species group of *Drosophila*[3–10]. The different dimensions of population cytogenetics of the B^+ and B^- strains of *D. n. albomicana* concerning their competitive fitness[11], resource utilization divergence[12], population fitness at different temperatures[13] and the characterization of heterochromatin (paper preparation) have been studied. During these studies, the frequency distribution of B-chromosomes of *D. n. albomicana* has been analysed over a period of three years and the results are reported.

The relative frequency of B-chromosome distribution was analysed during February 1983, August 1985 and February 1986. For each one of these assessments, 100 larvae were chosen at random to reveal the frequency distribution of B-chromosomes employing the temporary squash method[9].

Table 1 gives the number of individuals with B-chromosomes and the mean number of B-chromosomes per individual along with the standard error during three years of study. The mean number of B-chromosomes per individual during February 1983, August 1985 and February 1986 was 1.03, 1.88 and 2.47 respectively. Table 2 provides information about the number of individuals with different number of B-chromosomes analysed during the three years of study. During February 1983, 67 out of 100 individuals had B-chromosomes and the maximum number of B-chromosomes recorded in an individual was 3. After

Table 1 *Number of individuals with one or more B-chromosomes and the mean number of B-chromosomes per individual along with standard error in D. n. albomicana during three years of study (100 larvae were screened for each year)*

Years	Individuals with one or more Bs	Mean ± SE of Bs/individual
February 1983	67	1.03 ± 0.089
August 1985	95	1.88 ± 0.096
February 1986	98	2.47 ± 0.135

Table 2 *Number of individuals of D. n. albomicana with different number of B-chromosomes during three years of study (100 larvae were screened for each assessment)*

	Number of B-chromosomes							
Years	0 B	1 B	2 B	3 B	4 B	5 B	6 B	8 B
February 1983	33	36	26	05	–	–	–	–
August 1983	05	32	38	21	03	01	–	–
February 1986	02	20	38	22	10	05	02	01

2 ½ years of inbreeding i.e. during August 1985, 95% of the individuals were with the B-chromosomes. In addition, individuals with 4 Bs and 5 Bs were also observed. The analysis made during February 1986 showed that 98% of the individuals had one or more B-chromosomes. Interestingly, individuals with 6 Bs and 8 Bs were also recorded for the first time. Thus, the relative frequency of B-chromosome karyotypes ranges from one to eight Bs. These results indicate that the number of individuals with Bs increased steadily over three years.

The B-chromosomes have been reported in over 1000 plant species and 260 animals species[14]. There exist conflicting reports regarding B-chromosome frequency distribution in the biology of many animals and plants[14]. Nur[15] reported in the Mealy bug *Pseudococcus obscurus* where the frequency of B-chromosomes in a Californian population increased steadily for six years. Hewitt and John[16] reported the frequency of B-chromosomes in a population of *Myrmeliotettix maculatus* to be stable over a number of years. On the other hand, Kayano *et al*[17] surveyed eleven Japanese populations of grasshopper species, *Acrida lata* for periods up to 9 years. The proportion of individuals carrying B-chromosomes varied widely between populations from 8 to 36%. The proportion of individuals with Bs was constant for 9 of the 11 populations. In the remaining 2, the incidence of individuals with B-chromosomes varies over the years. Kayano *et al*[17] emphasized that this variation was the result of changes in the environment. A number of detailed studies of B-chromosomes[14] have concluded that B-chromosomes are most frequent in populations that exist in environments most favourable for the species. Considering that these flies showing an increase in the frequency of B-chromosomes over three years (1983–86) were maintained under favourable laboratory conditions is a testimony to the observation made by Jones and Rees[14].

There are many views to explain the mechanism(s) of accumulation of B-chromosomes. Nevertheless, Jones and Rees[14] pointed out that nondisjunction, loss of unpaired univalent B-chromosomes and the effect of B-chromosomes upon individual fitness are responsible for the accumulation of B-chromosomes in any genetic systems. In *D. n. albomicana*, besides these factors, favourable laboratory environment might have possibly influenced the accumulation of B-chromosome in individuals over a period of three years.

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NEWS

WRITING GEOLOGICAL HISTORY

A molecule of biological origina extracted from an ancient rock is just as much a fossil—a molecular fossil—as a familar mineralised shell from the same rock is a macro or microfossil. In the same way that time sequences of fossils from superimposed layers of rocks (strata) can be used to date them and determine the conditions under which they were deposited-the science of stratigraphy or historical geology—so molecular fossils may be used to develop a discipline of molecular stratigraphy. Recently, Geoff Eglinton, Simon Brassell, and their coworkers have been showing how lipid molecules from one particular alga can be used in this exciting new way as an addition to long-established methods of historical geology.

'The premise is that water temperature affects the production of lipids by microorganisms', Eglinton explains. 'So, in a given unicellular alga grown at 5, 15 or 20°C, the relative abundances of certain molecules will change systematically. We've demonstrated this in conjunction with Dr John Green and his colleagues at the Marine Biological Association in Plymouth. A particularly abundant and wide-ranging marine alga called *Emiliana huxleyi*, produces certain C_{37} alkenoes, with two, three and even four double bonds. It's the ratio of the two-to the three-double bond molecules that changes with growth temperature.

'So we have hypothesised that this sort of record, if it were contributed to the growing sedimentary pile, would enable us to plot water palaeotemperatures [ancient temperatures] against time. We've chosen to test this against an established indicator of water palaeotemperature—the obvious one was δO^{18}, that is, the ratio between O^{16} and O^{18} in carbonate shells from small marine animals called foraminifera'. Two complementary temperature-related effects alter δO^{18} for CO_3^{2-} deposited in foraminiferal shells; the availability of O^{16}, which depends on the amount of water tied up in the polar icecaps (lighter water is preferentially evaporated from the oceans to come down later as snow and then be held as ice), and the differential uptake of the isotopes by the growing forminifera at different water temperatures.

'Michael Sarnthein, a sedimentologist from Kiel University, selected a suitable site where drilling would give us about the last million years of sediment undisturbed. We sampled the drill core for our compounds, he sampled it for O^{16}:O^{18}— and lo and behold, in the upper part of the core (the past 700000 years or so) the correspondence is really quite startling, but there are some intriguing differences. It may be that these differences will help us to disentangle the two effects [polar ice cap size and tropical water temperature] belived to determine the O^{18} isotope record

The technique should help geologists to build up a more complete environmental picture for the sediments, and also to fill in gaps in their knowledge. For instance, carbonate shells are dissolved below the calcite compensation depth, so sediments laid down below this level in deep oceans preserve no δO^{18} signal; however, the molecular record of the alkenones is still present. *Chemistry in Britain*, Vol. 23. No. 4, April 1987, p. 304. Published by the Royal Society of Chemistry, Burlington House, London.