LETTERS TO THE EDITORS

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INVERSION POLYMORPHISM IN AN ANTARCTIC SPECIES LIVING IN A SIMPLE ENVIRONMENT.

The wingless chironomid *Belgica antarctica* Jacobs has the southernmost distribution of any Dipteran known at present. It is of particular interest to a population geneticist because some of the environments in which it lives are biotically amongst the most simple to be found in nature. In such simple and rigorous environments it might be expected that inversion polymorphism would be at a minimum to enable free recombination and hence retain genetic plasticity.

With the kind co-operation of Dr. J. L. Gressitt of the Bernice P. Bishop Museum, Hawaii, larvae of this species, collected by R. E. and T. S. Leech at the Gonzales Videla Base on the Danco Coast of the Palmer Peninsular in Antarctica, were made available for study in this laboratory. This most "peripheral" population is at 64°49' S latitude in an area frozen during winter and where even in summer the temperature is rarely above freezing. The plant life in the area comprises only algae, lichens and mosses, while springtails and mites are the only other free-living arthropods (Gressitt, 1961; Gressitt and Leech, 1961). In this simple environment *B. antarctica* goes through one generation a year. The larvae live in pools caused by melting snow and develop to the final instar before the pools freeze in early March. In this stage they overwinter near the soil surface. They pupate during late November and the adults are about from late December to late January. The adults live in the moss and under debris on rocks, becoming active when the rocks warm up by absorbing the sunlight. When mating, the adults form "accumulations" of from 5,000-6,000 individuals which float on the surface of the water (Torres, 1953; R. E. Leech, pers.comm.).

The larvae studied were fixed in alcohol by Mr. Leech and mailed to this laboratory where they were transferred to an alcohol-acetic acid mixture and refrigerated until the salivary glands were removed and stained in lactic orcein. The giant chromosomes suffered considerably by this treatment but in most cases were adequate for the detection of inversion loops. *B. antarctica* has three giant chromosomes, one of which carries a nucleolus. It was not determined whether this was carried on chromosome I or II. In one preparation a somatic metaphase was observed and it was confirmed that $2n = 6$.

Two inversions were identified. One was a large inversion in the chromosome carrying the nucleolus and extended from within a few bands of the

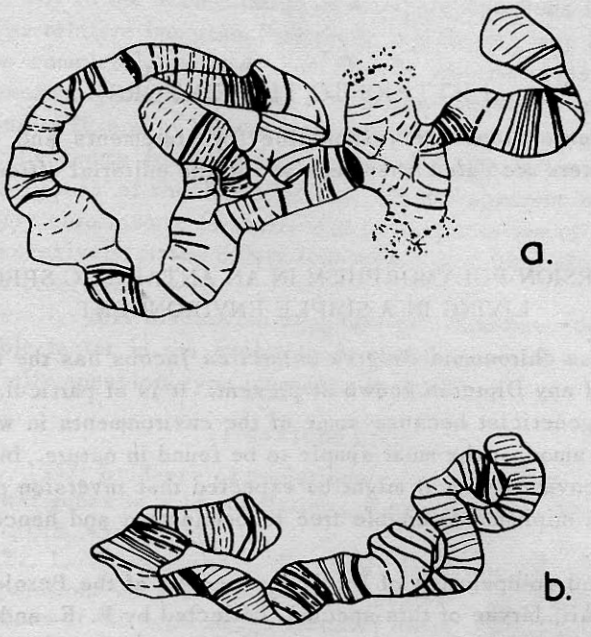

Figure 1. Camera lucida drawings of heterozygotes for (a) large inversion in the chromosome carrying the nucleolus, (b) smaller inversion in chromosome III.

nucleolus to within a few bands of the end of the chromosome, over half the length of the chromosome (figure 1a). At least ten of the 81 individuals studied were heterozygous for this inversion. The other was a smaller inversion in chromosome III (figure 1b) which was hard to identify with certainty because of its small size and the poor condition of the chromosomes. Three individuals definitely carried this inversion.

Thus it appears that even in such a rigorous and relatively simple biotic environment inversion polymorphism can be biologically adaptive as it is in populations living in more diversified temperate environments.

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