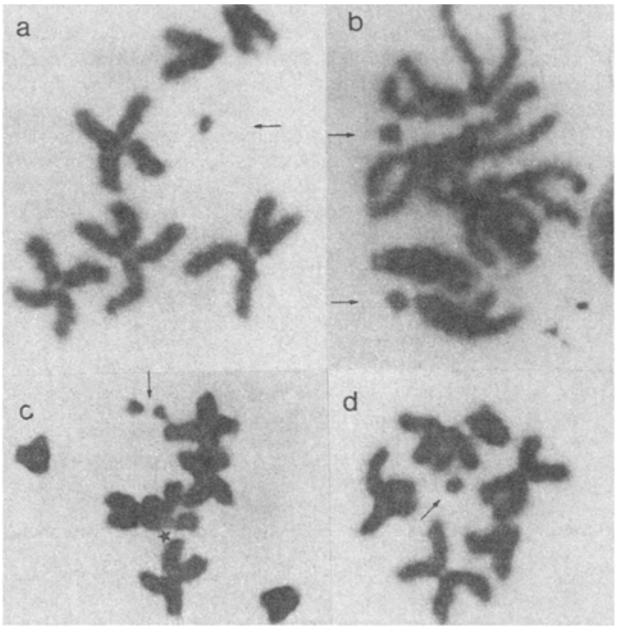
chromosome preparations. The prepared slides were subsequently stained with a 2% Giemsa solution, pH 7.0. At least 10 larvae from each isofemale line were cytologically examined. Photomicrographs were taken under oil immersion (× 670) on Kodak High Technical Film with green filter.

Results and discussion. The basic metaphase karyotype of *An. indefinitus* (2n = 6) consists of 2 pairs of metacentric (V-shaped) autosomes and 1 pair of telocentric (rod-shaped) sex chromosomes. Approximately 1/3 of the proximal region of the X chromosome exhibits a major block of constitutive heterochromatin. The distal region of the X chromosome is euchromatic. The Y chromosome is, as a general rule, almost totally heterochromatic.



Photomicrographs of mitotic metaphase chromosomes of *Anopheles indefinitus* from female (a, b) and male larvae (c, d). 1 B-chromosome in a and d, 2 B-chromosomes in b and c indicated by arrows. *Note abnormal elongation of an autosome in c.

The F_1 progeny from all 5 isofemale lines exhibited polymorphism for heterochromatic B-chromosome(s) in a dot-like configuration. Even though some F_1 larvae showed the normal metaphase karyotype, a large number of them had 1 (fig., a, d) or 2 B-chromosomes (fig., b, c). Thus, the presence of B-chromosomes is inconsistent among individuals from each family. In some preparations a B-chromosome clearly manifests 2 sister chromatids (fig., b). This indicates that B-chromosome heterochromatic material under certain conditions does undergo duplication and segregation in a manner similar to normal (A) chromosomes. Some individual larvae having either 1 or 2 B-chromosomes exhibit a structural abnormality in one arm of one of the autosomes (fig., c). The nature of this structural peculiarity is obscure. Unfortunately, observations on morphological, physiological and genetic effects of the B-chromosome(s) could not be made as the extra chromosomes were detected in larvae. However, it has been suggested that B-chromosomes could play an important role in the genetic system of higher organisms at various levels (e.g. chromosomes, cells and individual or any combinations of these within populations). Further, the B-chromosome may exert an effect on restriction of chiasma formation[6]. These important aspects of B-chromosomes merit further studies in *Anopheles* species that serve as human malaria vectors in Southeast Asia.

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Asynchronous puffing in the foot pad chromosomes of *Parasarcophaga*

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Summary. The foot pad polytene chromosome IIIL of *Parasarcophaga ruficornis* and *P. misera* shows a heterozygous puff in the region 7B–C. In *P. ruficornis* the heterozygosity is manifested as a difference in the timing of puffing between the 2 homologues. The outer and inner dorsal cells of the same foot pad also reveal asynchrony in puffing at this locus.

The occurrence of genetic variability is quite a common phenomenon in cross-breeding organisms. Among dipterans the analyses of polytene chromosomes have, in many cases, provided an opportunity for the visualization of heterozygosities which reflect genetic variability. Apart from a large amount of information about the cytological variations in the form of polymorphisms for inversions in several species of dipterans, polytene chromosome analysis has also provided information about the heterozygosities that are expressed as physiological differences between homologous chromosomes, in the form of heterozygous puffs[2–11]. Such puffs are strong indicators of a genetically determined difference.

The present communication gives an account of puff heterozygosity in *Parasarcophaga* (Sarcophagidae:Diptera) where the 2 homologues show a difference in the timing of puffing. Such puffs have previously been reported only in *Sciara* and it has been suggested that they may reflect differential action of some allelic genes in heterozygotes[9].

During a study of changes in puffing of foot pad chromosomes in a small laboratory stock of *Parasarcophaga ruficornis*[12] it was noticed that, in the 2 outer cells, the 2 homologues in region 7B–C of chromosome arm IIIL sometimes undergo their puffing cycles asynchronously on day 7. Until late on day 6 the 2 homologues remain condensed in all the preparations (fig. 1), but on day 7, in the foot pads of some individuals, one of the homologues is puffed while its partner remains unpuffed (fig. 2). This condition has been referred to as puff heterozygosity. One of the corresponding homozygous conditions with both the homologues remaining condensed on day 7 has also been encountered. The other homozygote with both the homologues in puffed state has not been found. By late day 7 both the homologues are puffed in step in all the preparations

examined (fig. 3). It is of interest that heterozygous individuals showing asymmetric puffs in the same chromosome region (i.e. 7B–C of IIIL) on day 7 are also found in the congeneric species *P. misera* (fig. 5), where one also finds individuals in which both homologues puff but to a different degree (fig. 6).

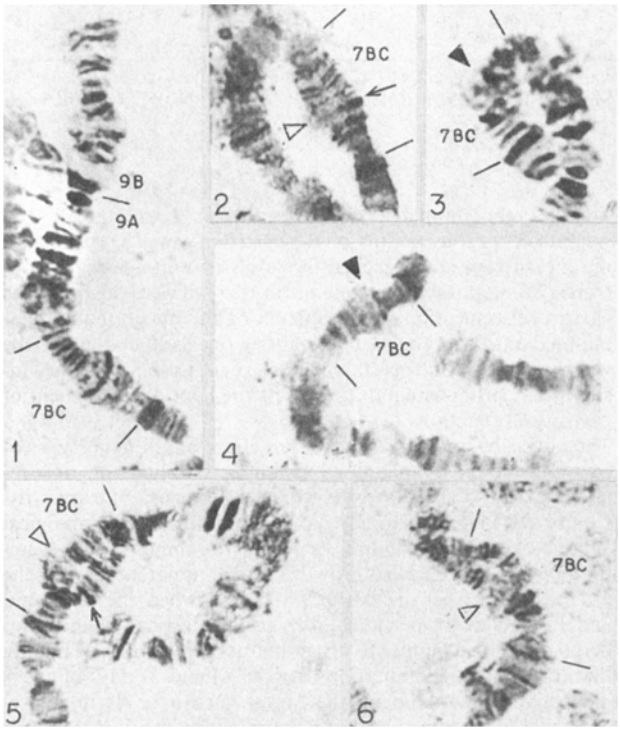

Figure 1. Chromsome arm IIIL (region 7B–C) of *P. ruficornis* in 6-day pupa showing no puff.

Figure 2. Chromosome arm IIIL (region 7B–C) of *P. ruficornis* in 7-day pupa showing heterozygous puff.

Figure 3. Chromsome arm IIIL (region 7B–C) of *P. ruficornis* in late 7-day pupa showing homozygous puff.

Figure 4. Chromosome arm IIIL (region 7B–C) of *P. ruficornis* in inner cells of the 7-day pupa showing no heterozygous puff.

Figure 5. Chromosome arm IIIL (region 7B–C) of *P. misera*, showing heterozygous puff.

Figure 6. Chromsome arm IIIL (region 7B–C) of *P. misera*, showing different degrees of puffing in both the homologues.

By contrast, the 2 inner cells of the same foot pad do not show puff heterozygosity on day 7 (compare figures 2 and 4, which show the outer and inner cells of the same foot pad). This is not surprising in view of the fact that in *Sarcophaga bullata* the puffing patterns in the 24-foot pad cells of the 3 pairs of legs have been found to be identical but not synchronous – the cells of the hind legs lag behind the cells of the fore legs, and the 2 outer cells of each foot pad lag behind the 2 inner cells[13].

The present results also demonstrate that the puff activity is not identical in both the cells. Since the outer cells lag behind the inner cells it is obvious that the same activity level of a certain puff is reached at a later stage in the outer cells than in the inner cells. Thus, it appears that in the heterozygotes one of the homologues becomes active a little later and as a result a puff heterozygosity appears on day 7 in the outer cells only. By late day 7 an identical activity level is reached in both the homologues in the outer cells.

The puff heterozygosity could be due to a submicroscopical change in one of the 2 strands, such that it delays the onset of puffing. The recent report of Staiber[14], demonstrating that transposition of a gene to a new location on the genome can affect its expression, opens the way for many interesting possibilities for speculation on the cause of the asynchronous activation of the 2 alleles; it could be envisaged that transposition of an element from or to the region in question might alter the time of onset of puffing in that homologue.

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Postnatal undernutrition: effect on antral gastrin levels at a later age

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Summary. In rats undernutrition from birth to 14 days of age resulted in retardation of growth and diminution of antral gastrin concentration. When the 14-day-old undernourished rats were nutritionally rehabilitated, they grew at a faster rate, and at 27 days of age their body weight and the weight of various tissues of the gastrointestinal tract including the antrum reached the levels of the well-nourished littermate controls. In spite of this, antral gastrin concentration was found to be about one-half of that of the well-nourished littermates.

It is hardly necessary to emphasize that infants are most vulnerable to nutritional inadequacies. Infancy is a period of rapid growth of the body and of various organs. At this time the immature organs grow at an accelerating rate[2] and the metabolic processes acquire homeostatic control presumably through the development of many endocrine systems. The gastrointestinal tract is the largest endocrine organ in the body. Endocrine cells are scattered throughout the gastrointestinal mucosa[3] and secrete a variety of hormones[4]. Although pre- or postnatal undernutrition has been shown to retard the growth of a number of organs including the gastrointestinal tracts[5], little is known about whether at nearly stages of life undernutrition affects the development and function of the endocrine system(s) of the digestive tract. In the present communi-