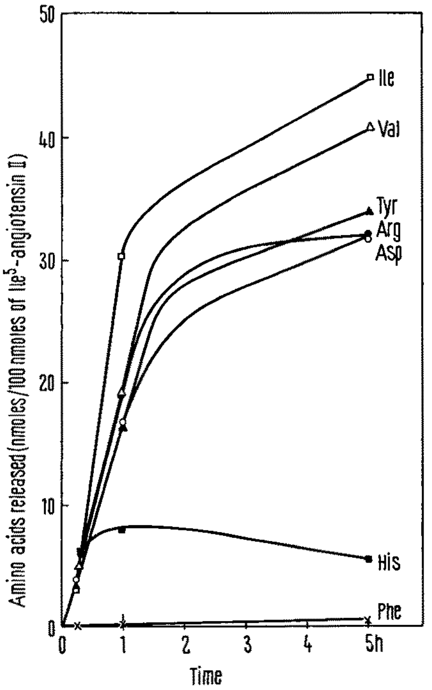
MATSUNGA et al[9]. reported the inactivation of Val[5]-angiotensin II by an enzymic activity, present in crude brain extracts, with properties similar to a neutral proteinase. The highly purified brain enzyme used in the present study, which possessed a marked specificity only for neutral and basic arylamides (Leu. βNA, Arg. βNA), rapidly hydrolyzed Ile[5]-angiotensin II. Thus this enzyme must differ from that described by MATSUNGA et al.[9] as well as from the Ca^{++}-dependent peptide hydrolase present in plasma, which is specific for acidic arylamides (α-Glu. βNA, α-Asp. βNA)[10]. Our finding that acid proteinase is unable to inactivate angiotensin is in accord with the known specificity of this enzyme for phenylalanine and leucine residues[8]. Inactivation by N-terminal cleavage is considered to be caused by aminopeptidases, yet interestingly the purified aminopeptidase from pig brain used in this study failed to release any free amino acids from Ile[5]-angiotensin II. The resistance of angiotensin II to this aminopeptidase may be associated with the presence of an aspartic acid residue adjacent to an arginine residue.



Release of amino acids as a function of time from Ile[5]-angiotensin II upon incubation with pig brain arylamidase. The values for histidine and isoleucine include peptide intermediates eluted at the same buffer volume as the given amino acids.

The arylamidase requires further study from the point of view of its possible physiological importance in the inactivation of peptide hormones in brain.

Zusammenfassung. Die hochgereinigte Arylamidase vom Schweinehirn spaltet, im Gegensatz zur ebenfalls isolierten Säureprotease und Aminopeptidase, Ile[5]-Angiotensin II, wobei die ersten 5 N-terminalen Aminosäuren von hydrolytischen Enzymen freigesetzt werden.

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Somatic Chromosomes of the Flat-Headed Bats (*Tylonycteris* spp)

The Malayan flat-headed bats, genus *Tylonycteris* Peters (Chiroptera, Vespertilionidae), have recently been reviewed[1]. The two species, *T. pachypus* (Temminck) and *T. robustula* Thomas, occurring in Malaya, are sympatric[2]. They appear to occupy very similar ecological niches but do not voluntarily associate at roost[3]. These closely related sympatric animals are therefore ideal for studying the isolating mechanisms which keep them distinct despite extensive overlap of ecological niche. The present communication deals with the somatic chromosomes of these flat-headed bats.

Materials and methods. Both species of *Tylonycteris* were collected from the University of Malaya Field Studies Centre, 16 mi Ulu Gombak, Selangor, Malaya. The bats were injected i.p. with 0.01 ml/g body weight of 0.04% colchicine solution. After 1.5 h, chromosome preparations were made from bone marrow by the usual hypotonic pretreatment, acetic-alcohol fixation and air-drying technique.

Results. The Table summarizes the number of specimens studied and the karyotypes of *Tylonycteris pachypus* and *T. robustula*.

Tylonycteris pachypus (Figure 1). 2 pairs of the meta/submeta-centric autosomes, as well as the *Y* chromosome, are distinctly smaller than the rest and constitute the smallest chromosomes in the complement. The acrocentric chromosomes together with the *X* chromosome are difficult to distinguish individually. All the larger chromosomes are also similar in size.

Tylonycteris robustula (Figure 2). As in *T. pachypus* the karyotype is characterized by 2 pairs of distinctive minute meta/submeta-centric autosomes as well as a minute *Y* chromosome. Unlike *pachypus*, there are 7 extra pairs of meta/submetacentric autosomes with a corresponding decrease of 14 pairs of acrocentrics. These meta/submetacentrics are larger than, or as large as, the largest acrocentrics and subacrocentrics. The acrocentric *X* chromosome is probably smaller than the largest acrocentric autosome. The larger meta/submeta-centric autosomes are also difficult to identify individually.

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Species	No. of specimens examined		2n	Pairs of autosomes[a]			Sex chromosomes	
	♂	♀		M	SA	A	X	Y
Tylonycteris pachypus	6	8	46	2+2[b]	2	16	A	M
Tylonycteris robustula	4	8	32	9+2	2	2	A	M

[a] M, meta/submeta-centric; SA, subacrocentric; A, acrocentric. [b] The 2 pairs of extremely small chromosomes are separated from the rest in Figures 1 and 2.

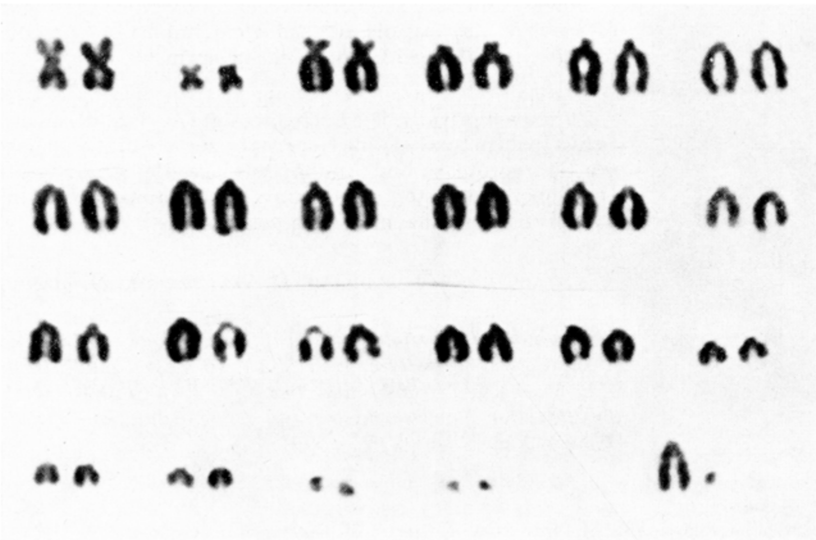

Fig. 1. Karyogram of male *Tylonycteris pachypus*. The chromosomes are arranged according to their morphology i.e. meta/submeta-centric, subacrocentric and acrocentric. The very small meta-submeta-centric autosomes are arranged separately at the end.

Fig. 2. Karyogram of male *Tylonycteris robustula*. Arrangement as in Figure 1.

Discussion. The chromosomes of bats have been extensively studied and the relevant data reviewed[4–6]. There is, however, no published record of the Malayan species. The two flat-headed bats reported here are unique ecologically. They roost in proctected cavities such as the internodal spaces of bamboo and rock crevices. Their dorsoventrally flattened skulls and expanded fleshy pads at the base of the pollex have therefore been attributed to ecological adaptations. These flat-headed bats thus offer a good opportunity to study the genetic constitution (similarity and divergence) of such closely-related species occupying very similar ecological niches. The genetic information would then illuminate the evolutionary process(es). The present report constitutes part of the genetical studies that are being carried out in our laboratory.

As described above, the karyotypes of these flat-headed bats are rather similar. Both possess 2 pairs of minute meta/submeta-centric and 2 pairs of subacrocentric autosomes, acrocentric *X* and minute meta/submeta-centric *Y* sex chromosomes. These chromosomes are presumed to be identical in the 2 species. In all the specimens studied, the males always possess 5 minute meta/submeta-centric chromosomes while the females have only 4, the diploid

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number being the same for both. Hence the sex determining mechanism is of the XY/XX type. The possession by *T. robustula* of 7 extra pairs of large meta/submeta-centric autosomes, with a corresponding reduction of 14 pairs of acrocentrics, can be explained by Robertsonian-type translocations, resulting in differences in chromosome number but maintaining the same total number of chromosomal arms (fundamental number) in the complement. A parallel case has been reported in the tobacco mouse (*Mus poschiavinus*) and the house/laboratory mouse (*Mus musculus*) with 26 and 40 chromosomes respectively[7,8]. Similar examples have also been described in other vespertilionid bats[6].

On karyological grounds, the 2 species of *Tylonycteris* can be said to be closely related, and their karyological difference is most likely the result of Robertsonian-type translocations. The present finding also throws more light on the karyotypes of closely related mammalian species and their importance as isolating mechanism. In the present case, these sympatric bat spedies exhibit great differences in chromosome number (46 in *T. pachypus* and 32 in *T. robustula*), which probably effectively maintain the 2 species distinct despite their occupying the same ecological niche. Although there is no direct evidence, the assumption is supported by a parallel situation found in 2 species of mice. In the tobacco mouse and the laboratory mouse, experimental evidence indicated marked reduction of fertility in the F_1 hybrids and the subsequent generations[7,8]. Furthermore, no intermediate karyotype has been found in the present materials of *T. pachypus* and *robustula* although they were collected from the same locality. The same mechanism probably also operates in 2 sibling rat species, *Rattus rajah* and *R. surifer*, with $2n = 36$ and $2n = 52$ respectively[9,10]. On the other hand, closely related rat species such as *Rattus edwardsi* and *R. sabanus*, which are normally non-sympatric, have the same diploid number[11,12]. The hypothesis that sympatric closely related species possess markedly different karyotype while allopatric closely related species possess rather similar karyotype is under investigation.

Zusammenfassung. Zwei sympatrische, nahverwandte Fledermausarten, *Tylonycteris pachypus* (Temminck) und *T. robustula* Thomas, besitzen 46 beziehungsweise 32 Chromosomen, was offenbar den Robertson'schen Translokationen zuzuschreiben ist.

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Inherited Semisterility for Control of Harmful Insects. III. A First Field Experiment

Several authors have suggested chromosomal aberrations (translocations, pericentric inversions) and the ensuing semisterility of heterozygotes as a means for control of harmful insects[1,2]. Mosquitoes seem to be very suitable for such an approach because translocations can be induced in this group in high yield[3] and with all degrees of sterility[4].

In a cage experiment in which semisterile males of *Culex pipiens* were released into a stable population, eradication could be achieved in 4 to 5 generations[5]. This theoretical success has led us to try a first small scale field experiment against the same species. That experiment was supported by the Entente Interdépartementale pour la Démoustication du Litoral Méditerranéen and took place during the summer and fall 1970.

In the experiment to be described here we used a laboratory strain with a translocation between the male-determining sex chromosome and an autosome giving a semisterility of about 50%. In such a case all males are semisterile and the translocation is inherited to all male offspring. That might not be the most effective type of translocation for control but it has the big advantage that it can hardly become homozygous. Therefore males of this kind can be released in any number into a natural population without fear that the translocation could become homozygous in the population and could cancel the temporary influence of heterozygosity.

The experiment was conducted in a small village 16 km north of Montpellier (Southern France). There a big abandoned well showed heavy breeding of *Culex pipiens*. Other potential breeding places were most of the time without larvae. The well was chosen because of its relative isolation and because of the fact that the daily production of adult mosquitoes in it could easily be measured. Mosquitoes ready for oviposition could only enter the well through 2 subsoil channels leading waste water into the well. Otherwise the well was totally closed. The top had a manhole which was normally also tightly closed. We opened this manhole and put a trap on it. In this way we could catch all new born mosquitoes leaving the well during the night for feeding.

As can be seen from Figure 1 the population in the well increased from a few hundred animals borne per day early in July towards middle of July to a peak of 2,400 per day. At the end of July the production was up to about 3,700 new adults per day. During the night 26/27th of July the trap had been turned over by storm, therefore the night-catch was suddenly interrupted (hatched part of the curve in Figure 1). But the opening of this easier access to the well had obviously attracted many more gravid females

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