	Diploid strain		Triploid strain		Mean deviation of the triploid strain from the diploid one in %	Probability of error in % (*t*-test)
	No. of experiments	Mean with standard error	No. of experiments	Mean with standard error		
Weight of 100 larvae in mg	7	180.7 ± 1.78	7	164.8 ± 1.01	− 9.6	> 0.1
Dry weight/100 g net weight	7	16.4 ± 0.118	7	15.8 ± 0.086	− 3.8	> 0.1
Nucleic acid content/100 g dry weight	7	5.81 ± 0.077	7	5.77 ± 0.064	− 0.69	ca. 50
RNA content/100 g dry weight	7	5.59 ± 0.055	7	5.53 ± 0.055	− 1.08	ca. 50
DNA content/100 g dry weight	7	$0.237 \pm 0.578 \cdot 10^{-2}$	7	$0.272 \pm 0.499 \cdot 10^{-2}$	+ 14.44	> 0.1

ones obviously starts at the level of nucleic acids. A more detailed publication is in the press[7].

Zusammenfassung. Beim triploiden *Drosophila*-Stamm *FM4, y^{31d} sc^{8} dm B/y^{2} sc w^{a} ec.* = ist der DNS-Anteil an der fettfreien Trockenmasse wesentlich höher als beim diploiden Stamm «*Berlin normal*». Der RNS-Anteil an der fettfreien Trockenmasse stimmt in beiden Stämmen überein. Es wird diskutiert, dass die 2 Genome der diploiden *Drosophila* offensichtlich etwa ebenso aktiv sind wie die 3 Genome der triploiden. *Drosophila* verfügt also offenbar über einen Regulationsmechanismus, der die RNS-Konzentration trotz unterschiedlichen DNS-Gehalts konstant hält.

R. FAHRIG and F. ANDERS

Genetisches Institut der Justus-Liebig-Universität, 6300 Gießen (Germany), 16th November 1966.

[7] F. ANDERS and R. FAHRIG, Biol. Zbl., in print.

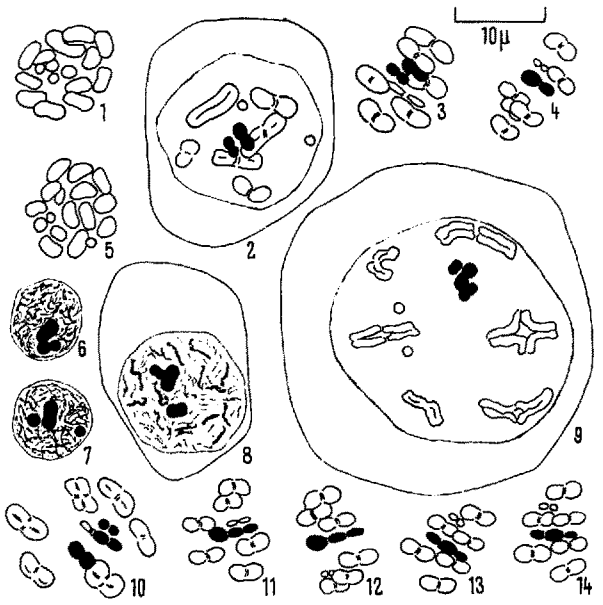
On the Multiple Sex-Chromosome Mechanism in *Trapezonotus arenarius* L. (*Heteroptera, Lygaeidae*)

Multiple sex-chromosome mechanisms have been described in numerous species of Heteroptera. However, only a few examples of such a mechanism have been reported, which occur besides a simple sex-determining mechanism of the *XX:XY* or *XX:XO* type[1]. The present communication, giving an account of meiosis in *Trapezonotus arenarius* L., is a continuation of the author's observations about chromosome cytology[2].

Testes of specimens collected in the environs of Olsztyn were dissected out in 0.6% saline and aceto-orceine squashes were made. The Figures have been drawn with a × 15 camera lucida eye-piece and × 100 oil immersion objective, giving a magnification of × 2400.

The chromosome complement in the spermatogonial metaphase plates of individuals with a simple sex-determining mechanism shows 16 chromosomes (Figure 1). They comprise 12 large and 4 small unequal size elements. The smallest 2 elements are a pair of *m*-chromosomes. The remaining 2 of the last-mentioned 4 elements represent the *X* and *Y* chromosomes. The *m*-chromosome pair and the *X* and *Y* ones are at this stage detectable from the autosomes only by their heteromorphic structure. The heteropycnotic character of the sex-chromosomes is just seen in the spermatocytes in which they are found, at first separated (Figures 2 and 3), then associated (Figure 4), together with the *m*-chromosome pair at the centre of the autosomal elements which form a ring around them.

During the studies the author happened to examine an individual which was found to differ markedly in its



Figs. 1–4. Meiosis of a single sex-determining mechanism of *X-Y* type (sex-chromosomes shown in black). Figs. 5–14. Meiosis of a multiple sex-chromosome mechanism. 1. Spermatogonial metaphase showing 16 chromosomes. 2. Late prophase I. 3. Metaphase I. 4. Metaphase II. 5. Spermatogonial metaphase showing 17 chromosomes. 6 and 7. 2 early prophase I nuclei with 3 sex-chromosomal elements each. 8. Prophase I. 10. Metaphase I. 11 and 12. Metaphase II showing the sex-pseudotrivalent set in order '*X* 1 supernumerary *Y*' or '*XY* 1 supernumerary'. 13 and 14. Metaphase II showing the sex-pseudotrivalent set in order '*XY* 1 supernumerary'.

karyotype from that already described. In the spermatogonial cell at metaphase there are 17 chromosomes (Figure 5). 12 large autosomes and 2 small *m*-chromosomes are clearly distinguishable. The remaining 3 elements are probably the sex-chromosomes. The primary spermatocyte nuclei are seen to possess 3 distinct heteropycnotic bodies which represent the sex-chromosomes observed at first as 3 heteropycnotic masses (Figures 6 and 7) and at the later stages as deeply stained bipartite elements easily detectable from the autosomal bivalents (Figures 9 and 10). At the second spermatocyte metaphase, 2 different sets of cells, one set containing sex-pseudotrivalent in the order '*X* 1 supernumerary *Y*' or '*X Y* 1 supernumerary' (Figures 11 and 12) and the other containing the sex-pseudotrivalent in the order '*Y X* 1 supernumerary' (Figures 13 and 14), are observed.

The pairing of *m*-chromosomes occurs later than the association of the homologous autosomes and therefore the primary spermatocyte plates contained, independently of a different sex-chromosome number, an unequal number of the remaining elements (Figures 2, 3 and 9,10). The *m*-chromosomes, separated or paired, are easily detectable from the autosomal bivalents by their different size and from the sex-chromosomes, which are deeply stained and have bipartite structure, too. It is impossible not to distinguish the 2 sets of cells, although they have the same number of chromosomal elements.

The number, $2n = 16$ in *Trapezonotus arenarius* L. described by PFALER-COLLANDER[3] and by the author, seems to be a modal number of this species and *XX:XY* sex-mechanism is characteristic. On the other hand, however, the diploid number of chromosomes determined as 17 (based on the author's observations) clearly indicates the existence of a multiple sex-chromosome mechanism.

Zusammenfassung. Die charakteristische Grundzahl der Chromosomengarnitur bei *Trapezonotus arenarius* L. wurde mit $12A + 2m + X + Y$ gefunden, wobei ein Individuum mit überzähligem Geschlechtschromosom festgestellt werden konnte.

M. MIKOLAJSKI

Zoology Department, Agricultural University, Olsztyn (Poland), 17th October 1966.

[1] P. HEIZER, J. Morph. *87*, 179 (1950). – S. MAKINO, *An Atlas of the Chromosome Number in Animals* (Iowa State College Press, Aimes 1951). – G. K. MANNA, Int. Congr. Ent. *2*, 919 (1958).
[2] M. MIKOLAJSKI, Zoologica Pol. *14*, 15 (1964); Experientia *21*, 445 (1965).
[3] E. VON PFALER-COLLANDER, Acta zool. fenn. *30*, 1 (1941).

Studies on Human Lymphocytes Stimulated in vitro with Anti-γ and Anti-μ Antibodies

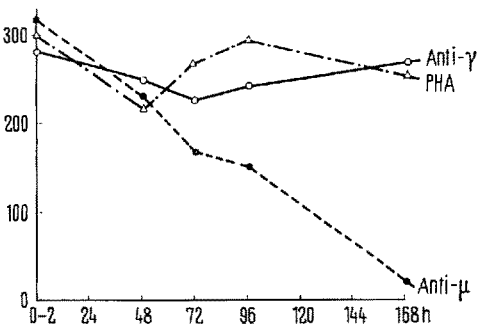
Peripheral lymphocytes of rabbits may be stimulated in vitro to transform into blast cells and to synthesize DNA if cultured in the presence of antisera to rabbit γG-globulin or specific antiallotype sera (SELL and GELL[1], SELL et al.[2]).

The present report describes experiments designed to see if human lymphocytes would transform into blast cells and synthesize DNA after being stimulated with antibodies against the heavy chains of γG-globulin (γ-chain) and of γM-globulin (μ-chain).

Materials and methods. Horse anti-γG-globulin serum (containing 9.2 mg of anti-γG/ml) was made specific to γG heavy chain (anti-γ) by inhibition with light chains prepared as described by FLEISCHMAN et al.[3]; the anti-μ serum was prepared by injecting γM-globulin into a rabbit and by inhibiting the antiserum with cord serum (ADINOLFI et al.[4]).

Before being used, the antisera were heated at 56 °C for 20 min and absorbed 3 times with a mixture of red and white cells.

Samples of blood were collected by venipuncture from a healthy donor (B.G.); 10 ml of blood were mixed with 0.1 ml of heparin (5000 IU/ml). After centrifugation at 2000 rpm the plasma was discarded; the buffy coat was recovered and the cells were washed 4 times in Hank's B.S.S. (Difco) and finally suspended in 5 ml of the same solution. Aliquots of 1 vol. of the cell suspension were mixed with 2 vol. of the solution containing each stimulating factor under test, i.e. phytohemagglutinin (Burroughs Wellcome), anti-γ and anti-μ. 0.6 ml of each mixture was transferred to culture bottles, each containing 2 ml of foetal calf serum (Grand Island Biological Co., USA) and 6 ml of T.C. 199 Difco. The cultures were gassed with 5% CO_2 and incubated at 37 °C; 1 culture from each group was terminated at intervals of 24 h; 2 h before



Number of cells in cultures stimulated with PHA, anti-γ or anti-μ (see text).

[1] S. SELL and P. G. H. GELL, J. exp. Med. *122*, 423 (1965).
[2] S. SELL, D. S. ROWER and P. G. H. GELL, J. exp. Med. *122*, 23 (1965).
[3] J. B. FLEISCHMAN, R. H. PAIN and R. R. PORTER, Arch. Biochem. Biophys., Suppl. 1, 174 (1962).
[4] M. ADINOLFI, M. Y. J. POLLEY, D. A. HUNTER and P. L. MOLLISON, Immunology *5*, 566 (1962).