Une telle formule présuppose la formation méiotique d'un trivalent avec disjonction anaphasique en X et Y_1Y_2. Il doit donc exister des métaphases II de deux types, l'un avec 21 dyades dont l'X, l'autre sans X mais avec 22 éléments. Ces prévisions se réalisent exactement comme les Figures 3–6 le démontrent. A la métaphase I (Fig. 3), il y a 21 constituants, le trivalent sexuel étant formé de l'X et de deux petits chromosomes formant un bivalent rattaché à l'extrémité distale de l'X. Il est douteux que cette liaison soit chiasmatique, ce qui impliquerait l'existence d'un triple chiasma. Les profils (Fig. 4) montrent la disjonction en X et Y_1Y_2 et les secondes cinèses sont effectivement de deux types caractérisés par 21 et 22 chromosomes. Les figures à 21 (Fig. 6) permettent d'identifier facilement le grand X qui manquent aux divisions montrant 22 chromosomes.

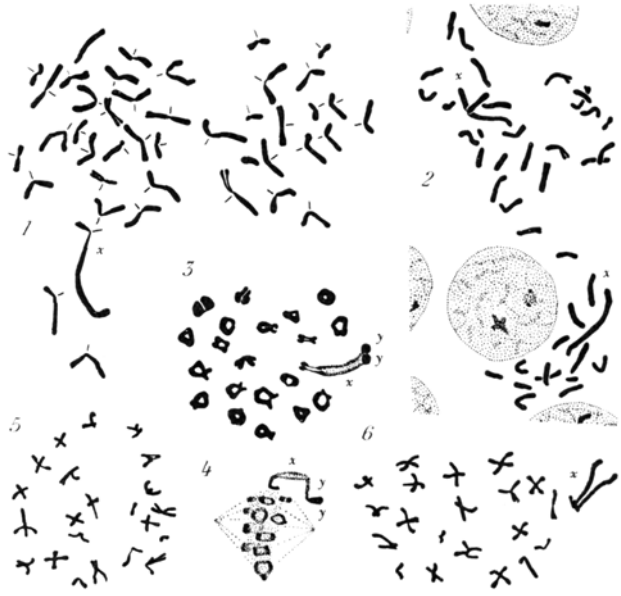


Fig. 1. Prométaphase spermatogoniale, 43 chromosomes.
Fig. 2. Prométaphase folliculaire, 42 chromosomes.
Fig. 3. Métaphase I vue en plaque équatoriale, 20 bivalents et le trivalent sexuel X-Y_1Y_2.
Fig. 4. Métaphase I vue de profil avec le trivalent sexuel.
Fig. 5. Métaphase II, 22 chromosomes.
Fig. 6. Métaphase II, 21 chromosomes dont l'X.
Les figures 1–3 et 5–6 d'après des préparations par écrasement. La Figure 4 d'après une coupe. FEULGEN. × 1400.

Si la démonstration du type de digamétie est aisée, son interprétation cytogénétique est très difficile. Il conviendra de comprendre aussi les rapports qui peuvent exister entre les chromosomes sexuels multiples de *G. pyramidum* et ceux de *G. gerbillus*.

R. MATTHEY

Laboratoire de zoologie de l'Université de Lausanne, le 30 juin 1954.

Summary

4 species of the genus *Gerbillus* have been studied by the author; two belong to the usual scheme X–Y, X–X, two are provided with multiple sex-chromosomes. *Gerbillus gerbillus* ♂ shows at the first metaphase a sexual trivalent X–Y_1Y_2 and 20 autosomal bivalents. The diploïd number is 43. As expected, there is two types of metaphases II, with 21 and 22 elements respectively. The diploid number of the ♀ is 42 (two X).

Enhanced Susceptibility of a Highly Resistant Strain of Houseflies to Ingestion of Potassium Bromide

Various observations, that field resistant houseflies are more vigorous[1] have been recorded and, indeed, resistant strains from Sweden[2] and Egypt[3], have been found to be more resistant to adverse temperatures than susceptible strains. Others, on the contrary, hold the opinion, that the genes for insecticide resistance must somehow be detrimental[4] and that *high* resistance may be linked with cases of low viability, slower larval development[5] and decreased reproductive potential in the housefly and to some lesser extent in other resistant insects[6]. Finally, no significant difference could be shown between the resistant Bellflower strain, California, and a susceptible strain, as regards length of life cycle, average weight and susceptibility to heat and cold[7]. BABERS, PRATT, and WILLIAMS[8] could find no difference attributable to resistance between 6 susceptible and 2 resistant strains of houseflies, as regards egg viability, length of larval life and number of adult flies obtained; they attribute the differences in larval period found by other authors to differences in environment[9] and to the large variation in the length of larval period, which is not peculiar to resistant strains[10]. They found, however, that the percentage of hatch of eggs of their most resistant strain (R-OB_{64}) was definitely lower than that of other strains[10].

In a recent study, VARZANDEH, BRUCE, and DECKER[11] demonstrated with 3 susceptible and 4 resistant strains that "the inheritance of the factors associated with vigor such as egg production, pupal or adult weights, longevity of adults, egg hatchability and the survival of larvae and pupae, were independent of the factors associated with resistance". The only difference found by these authors is that, in general, resistant strains tended to have the longer pupal period.

In view of this controversy, it was deemed of interest to record here experiments in which the response of houseflies to the ingestion of salt solutions was investigated.

Experimental.–The majority of the experiments was carried out with a susceptible strain (T_1)[12] of *Musca domestica L.* and a highly resistant strain (K_1)[12]. The eggs

[1] H. TRAPIDO and J. M. WEIR cited by A. D. HESS, Amer. J. Trop. Med. Hyg. *1*, 371 (1952). – A. MISSIROLI, Riv. Parassitol. *12* (1), 5 (1951).

[2] R. WIESMANN, Mitt. Schweiz. Ent. Ges. *20*, 484 (1947).

[3] J. M. WEIR cited by A. D. HESS, Amer. J. Trop. Med. Hyg. *1*, 371 (1952).

[4] J. F. CROW, Conference on Insecticide Resistance and Insect Physiology, Natl. Acad. Sci. Publ. No. 219, p. 72 (Washington 1952).

[5] W. N. BRUCE, Pest Control *17* (6), 7 (1949). – D. PIMENTEL, H. H. SCHWARDT, J. E. DEWEY, and L. B. NORTON, Soap Sanit. Chem. *26* (12), 94 (1950). – F. M. SNYDER, cited by L. E. CHADWICK, Amer. J. Trop. Med. Hyg. *1*, 404 (1952). – Claims to the contrary, namely that the larval life of a resistant strain is slightly shorter than that of a susceptible strain, have also been advanced; see e.g. M. GAGLIANI, Boll. Soc. Ital. Biol. Sper. *26* (3), 326 (1952).

[6] R. W. FAY, W. C. BAKER, and M. M. GRAINGER, J. Natl. Mal. Soc. *8*, 137 (1949).

[7] R. B. MARCH and L. L. LEWALLEN, J. Econ. Ent. *43*, 721 (1950). – R. B. MARCH and R. L. METCALF, Soap Sanit. Chem. *26* (7), 121 (1950).

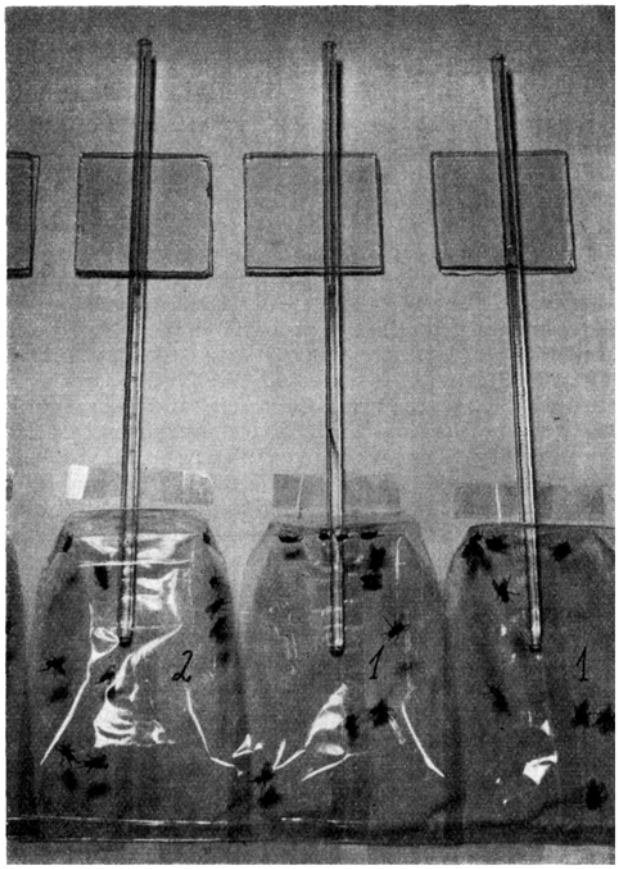
[8] F. H. BABERS, J. J. PRATT, and M. WILLIAMS, J. Econ. Ent. *46*, 914 (1953).

[9] J. J. PRATT and F. H. BABERS, J. Econ. Ent. *46*, 864 (1953).

[10] F. H. BABERS, J. J. PRATT, and M. WILLIAMS, J. Econ. Ent. *46*, 914 (1953).

[11] M. VARZANDEH, W. N. BRUCE, and G. C. DECKER, J. Econ. Ent. *47*, 129 (1954).

[12] C. KOCHER, W. ROTH, and J. TREBOUX, Anz. Schädlingsk. *26* (5), 65 (1953).



Feeding of flies with salt solutions. The pipettes are introduced through closely fitting holes in the cellophane bags, cut with a cork borer and are kept in slightly slanted position with the help of small glass plates. The cellophane bags are closed by folding the open end twice, wetting the margin with water and pressing down. Bags and pipettes are fixed to the table with cellulose tape.

of this strain are obtained from a *breeding* parent colony, kept since 1948 in continuous contact with dichlorodiphenyltrichloroethane. Apart from this, the two strains are grown under exactly identical conditions since 6 years[1]. Three days old females (average weight of 17·5 mg in both strains) were selected (immobilization by chilling) and introduced in groups of ten into perforated cellophane bags (BERAN[2]). The solutions, which always contained in addition 2% sugar[3], were offered to the flies in 1 ml graduated pipettes[4], cut off at the 0·99 ml mark in order to facilitate access (Figure). Each test was done with 5 × 10 flies and repeated at least 4 times on different days. The control runs were done with flies fed on 2% sugar solutions only, while rates of evaporation of the solutions were determined in the same type of arrangement *without* flies. The temperature was 23°C. Essentially the same results were obtained, when the solutions were offered on cotton wool.

Results. No difference was shown in the response of the two strains to solutions of potassium arsenate, bromate, chloride, iodide, thiocyanate, nitrate, ferricyanide, ferrocyanide and formate, and sodium oxalate and borax, in different concentrations. On the other hand it was found, that K_1 was more susceptible to KBr than T_1 (Table I). From Table II it is discernible, that while the toxicity of NaBr and NH_4Br is somewhat lower than that of KBr, the difference in the response of the two strains is less marked, especially in NH_4Br. $MgBr_2$ and especially $CaBr_2$ are evidently much less toxic. It was found that flies of the two strains always drank equal amounts of the solutions offered until onset of knockdown.

Table I.—Toxicities of solutions of KBr to strains K_1 and T_1

Solution*	Strain	Observed after				Average amount of solution per fly, ingested during the first 14 h, in ml**
		14 h	17 h	20·5 h	24 h	
		% Knock-down				
0·2 N KBr	K_1	30	51	70	88	0·007
	T_1	12	20	33	44	
0·1 N KBr	K_1	24	30	37	54	0·012
	T_1	6	10	17·5	32·5	
0·05 N KBr	K_1	10	18	31	36	0·014
	T_1	2	5	14	18	
Control	K_1	0	0	0	0	0·017
	T_1	0	0	0	0	

It is of interest to compare these results with the classical work of LOEB about the toxicity of bromides to fish (*Fundulus*). NaBr, highly toxic[1] to Fundulus, was more toxic than $MgBr_2$[2] and much more toxic than $CaBr_2$[3].

Table II.—Toxicity of various bromides to strains K_1 and T_1

Solution*	% Knock-down after 24 h		Average amount of solution per fly, ingested during the first 14 h, in ml**
	K_1	T_1	
0·2 N KBr . . .	90	49	0·007
0·2 N NaBr . .	80	55	0·007
0·2 N NH_4Br . .	71	57·5	0·007
0·2 N $MgBr_2$ . .	39·5	20	0·006
0·2 N $CaBr_2$ . .	15	5	0·005
Control	1	0	0·017

* All solutions contained also 2% sugar.
** Corrected for evaporation.

LOEB also demonstrated[4], that NaBr solutions could be detoxified by equimolecular quantities of NaCl. Similar effects could now be shown in the housefly (Table III). In KBr-KCl mixtures, KCl gave full protection in the 1:1 ratio, while affording some protection even in the 4:1 ratio. KJ affords a certain protection in the 1:1 ratio, slight protection in the 2:1 ratio, while affording no protection at all in the 4:1 ratio. KNO_3 offers only slight protection even in the 1:1 ratio.

[1] No difference was found between these two strains in their resistance to abiotic temperatures, K. R. S. ASCHER (unpublished data).
[2] F. BERAN, Pflanzenschutzber. *11*, 151 (1953).
[3] No differences were noted in series prepared with 1, 2, and 3% sugar; 10% sugar, however, caused higher mortalities.
[4] T. STAUDENMAYER, Z. vgl. Physiol. *26*, 644 (1939).

[1] J. LOEB and H. WASTENEYS, Biochem. Z. *39*, 183 (1912).
[2] J. LOEB, Biochem. Z. *66*, 277 (1914).
[3] J. LOEB, Biochem. Z. *39*, 194 (1912).
[4] J. LOEB and H. WASTENEYS, Biochem. Z. *39*, 183 (1912). – J. LOEB, Biochem. Z. *43*, 181 (1912).

Table III.—Rate of protection afforded to strain K_1 by KCl, KJ, and KNO_3 against poisoning by KBr

Solution*	% Knock-down after 24 h
0·2 N KBr + 0·2 N KCl	7·5
+ 0·1 N KCl	20
+ 0·05N KCl	37.5
0·2 N KBr + 0·2 N KJ	21
+ 0·1 N KJ	53·5
+ 0·05N KJ	75
0·2 N KBr + 0·2 N KNO_3	46
Control	2

* All solutions contained also 2% sugar.

The enhanced susceptibility of the highly resistant K_1 strain is evidently a strain specifity, since it could not be demonstrated in a strain from Venezuela (only slightly resistant to dichlorodiphenyltrichloroethane) and in 3 strains selected (by contact of short duration in each generation of *breeding* adults only) for resistance to lindane, dieldrin and pyrolan, respectively.

The observation of BARTLETT[1], who found that among strains of *Drosophila melanogaster* Meig. (from U.S.A., Sweden and Canada), some strains susceptible to dichlorodiphenyltrichloroethane were much more resistant to HCN, than strains resistant to dichlorodiphenyltrichloroethane, seems to belong in the same category[2].

It is intended to pursue this study by proving or disproving the conjecture, that the enhanced susceptibility of the strain K_1 to KBr is due to its reduced chloride content, caused by a detoxification mechanism, which is in action, even when the insect is not exposed to dichlorodiphenyltrichloroethane.

K. R. S. ASCHER[3] and C. KOCHER

Research Laboratories of J.R. Geigy S.A., Basle, July 8, 1954.

Résumé

Une souche de mouches résistant au dichlorodiphényltrichloroéthane fut trouvée plus susceptible à l'ingestion de bromure de potassium qu'une souche de mouches normales. Il s'agit là évidemment d'une caractéristique spécifique de cette souche, étant donné que l'on n'a pas pu observer une suceptibilité plus élevée vis-à-vis du bromure de potassium chez des souches résistant à d'autres insecticides.

[1] B. R. BARTLETT, Can. Entomologist *84* (7), 189 (1952).

[2] A detoxification of NaCl by traces of KCN has been demonstrated with fertilized sea urchin eggs by LOEB, Biochem. Z. *27*, 304 (1910).

[3] Permanent address: Medical Research Laboratories, Medical Corps, Israel Defence Forces, Israel.

Analyses chromatographiques des corticoïdes extraits du liquide amniotique d'une femme diabétique

Nous avons soumis à l'analyse chromatographique des extraits de liquides amniotiques normaux.

La préparation des extraits a été faite selon le «flow-sheet» Figure 2, page 468.

La chromatographie sur papier a été faite par la technique de BUSH[1].

L'identification des fractions chromatographiques est basée sur leur vitesse de migration, sur la réaction avec le bleu de Tetrazolium (CHEN[2]) et sur les tests de fluorescence en lumière U.V. après traitement par NaOH (BUSH[1]) et par H_3PO_4 (NEHER et WETTSTEIN[3]).

Aucun des chromatogrammes des extraits de liquides amniotiques normaux n'a permis de reconnaître l'existence de la 17-hydroxycorticostérone et de la cortisone ou d'une autre fraction de caractère stéroïde certain. Les très faibles réactions qui ont pu être décelées sur le chromatogramme ne peuvent correspondre qu'à des quantités infinitésimales. Par exemple l'extrait provenant de deux litres de liquides amniotiques normaux (mélange obtenu de trois cas strictement normaux) n'a pas permis de mettre en évidence une trace de la 17-hydroxycorticostérone ou de la cortisone.

Le chromatogramme de l'extrait de 650 ml du liquide amniotique de femme diabétique[4], permet de reconnaître les fractions qui correspondent au point de vue de leurs positions et de leurs propriétés réactionnelles à la 17-hydroxycorticostérone et à la cortisone (Fig. 1).

Nous avons apprécié par comparaison visuelle avec les chromatogrammes de référence les quantités de ces deux substances présentes dans l'extrait. Notre approximation aboutit entre 25 et 50 μg pour la totalité de l'extrait, c'est-à-dire, une concentration de 4 à 8 μg par 100 ml de liquide.

Chromatographie sur papier. Liquide amniotique femme diabétique

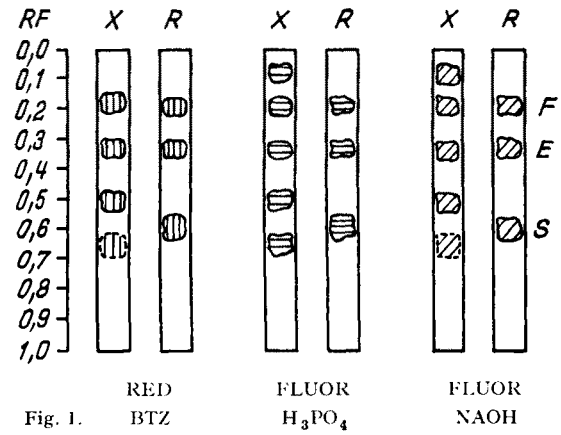


Fig. 1.

Nous retenons également la présence de trois autres fractions sur le chromatogramme. La première, plus polaire que la 17-hydroxycorticostérone, semble être quantitativement très importante. Elle n'est pas réductrice et sa vitesse de migration ainsi que les tests de fluorescence suggèrent qu'il peut s'agir de la substance E de REICHSTEIN (Δ^4 Pregnene, 3—one, 11, 17, 20, 21 —Tétrole).

Conclusions. Le liquide amniotique normal ne contient pas de 17-hydroxycorticostérone, ni de la cortisone.

[1] I. E. BUSH, Biochem. J. *50*, 370 (1952).

[2] C. CHEN and H. E. TEWELL, Fed. Proc. *10*, 377 (1951).

[3] R. NEHER et A. WETTSTEIN, Helv. chim. Acta *34*, 2279 (1951).

[4] Mme Ker. 37 ans. 6e grossesse. Seul le 2e enfant est en vie. Tous pesaient 4 kg et plus. En 1945, 5e grossesse: le nouveau-né de 5,1 kg cyanosé, présente probablement une malformation congénitale du cœur, meurt le 11e jour. Traitée à l'insuline à partir du 4e mois. Accouchement à 8 mois et demi. Nouveau-né présente un aspect «Cushing» et une anomalie congénitale des vertèbres cervicales (KLIPPEL-FEIL).