Condition of polytene elements and metaphase plate figures of chromosome 4 of the same larvae of *D. formella*

Polytene gene sequence condition	Metaphase plate condition	No. of larvae	
		Female	Male
j^3/j^3	1 pair of autosomes with very little centromeric heterochromatin	6	5
k^3/k^3	The same autosome pair demonstrates large blocks of heterochromatin	4	5
j^3/k^3	A heteromorphic pair is present and only 1 chromosome shows little centrometic heterochromatin	22	20
Total		32	30

significant role in evolutionary diversity and species differentiation through chromosomal rearrangements by chromosomal breaks and refusions such as inversions and translocations. Thus the idea of the chromosome-break effect as evident in this and in the previous observations in Hawaiian *Drosophila* may shed some light on the problem of constitutive heterochromatin, and the phenomenon may be universal.

Zusammenfassung. Polytane Chromosomen und Metaphasen der Ganglionen von *D. formella*-Larven aus Hawaii wurden untersucht. Die Ergebnisse unterstützen das Konzept über die möglicherweise wichtigen zytologischen Wirkungen des Chromosomenbruches im Bereich des zentromeren Heterochromatins.

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[9] Acknowledgments. The author wishes to express his appreciation to Prof. H. L. Carson for his interest and encouragement during this study and offering valuable suggestions on the manuscript. This work was carried out at Genetics Department, University of Hawaii, and was supported by Grants Nos. GB27586 and GB29288 from the National Science Foundation.

Response of *Drosophila pavani*, *Drosophila gaucha* and their Hybrids to Larval Biotic Residues

Drosophila pavani is a neotropical species that occurs mainly in Central Chile, and its sibling species *D. gaucha* has been found in Southern Brazil, Uruguay, Argentina and Bolivia. The two species overlap their distributional area in a small zone near San Luis (Argentina). Crosses between the two species give an abundant hybrid offspring that is 100% sterile. In experiments on competitive ability of pre-adults of both species and their hybrids under crowding conditions in terms of food and space, it was found that the egg-to-adult survival of the hybrids is higher than that of the corresponding parental species when the pre-adults are reared alone. When these hybrids are bred together with the parental species, there is a significative decrease in their viability. On the other hand, *D. pavani* and *D. gaucha* increase their viability in the presence of the hybrids[1].

During the pre-adult stages, species or genotypes can be submitted to two aspects of competition: 1. Exploitation, the use by competing individuals of resources in short supply, mainly food and space, and 2. Interference, the harming of one or both species or genotypes living together, or the less efficient use of the resources as a result of coexistence[2,3]. A kind of interference observed in the *Drosophila* genus is the effect of the metabolic waste products over the larval viability[4,5]. For instance, recent experiments in which *D. pavani* were reared in culture media that had previously been used for the growth of larvae of the same species ('conditioned' medium[4-6]), revealed that *D. pavani* larval biotic residues inhibited the viability of its own as well as other species[6]. For the above reasons, the results observed when *D. pavani*, *D. gaucha*, and their hybrids are put together under competitive conditions, cannot be attributed entirely to food or space competition. During the course of investigations in which the 2 species and their hybrids were bred in an excess of food, it was observed that interference of the type described above also occurs.

In the experiments, groups of vials containing 10 cm^3 of basic *Drosophila* food media were sown each with 100 fertilized eggs of either *D. pavani*, *D. gaucha*, or from females of each one of the species inseminated by males of the other (hybrid eggs). The larvae were allowed to develop for 5 days at 25 °C, and then were killed by placing the vials in a temperature of −30 °C. After allowing the vials to thaw at room temperature ('conditioned' vials), they were sown each with 100 eggs of the same species previously used for conditioning the food media, or the other species or with hybrid eggs. The total number of eggs transferred in each group was of 1000. Series of vials were set up concurrently, containing fresh 'non-conditioned' culture media, and to which were sown independently an equal number of eggs of the parental species or hybrid eggs. All vials were placed in a constant temperature chamber at 25 °C and fresh yeast was added every 2 days in order to avoid food competition.

The Table indicated the total number of eggs sown, the number of emerging adults, and the mean values of viability per vial, with the corresponding standard errors. It is interesting to note that the metabolic waste products of *D. pavani*, *D. gaucha*, and their hybrids inhibit the

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Differences in preadult viability of *D. pavani*, *D. gaucha* and their hybrids bred in 'conditioned' and in 'nonconditioned' medium

Species and medium	No. of eggs	No. of adults emerged	$\bar{X}$ viability for vial and SE	χ^2	P (1 DF)
D. pavani (nonconditioned)	1000	538	53.8 ± 1.91		
D. pavani (conditioned with *pavani*)	1000	314	31.4 ± 2.31	102.59	< 0.0001
D. pavani (conditioned with *gaucha*)	1000	470	47.0 ± 4.30	9.24	0.003
D. pavani (conditioned with *hybrids*)	1000	352	35.2 ± 3.64	70.03	< 0.0001
D. gaucha (nonconditioned)	1000	726	72.6 ± 1.91		
D. gaucha (conditioned with *gaucha*)	1000	591	59.1 ± 3.81	40.52	< 0.0001
D. gaucha (conditioned with *pavani*)	1000	750	75.0 ± 5.21	1.48	0.2–0.3
D. gaucha (conditioned with *hybrids*)	1000	743	74.3 ± 2.10	0.74	0.4–0.5
p/g hybrids (nonconditioned)	1000	676	67.7 ± 1.96		
p/g hybrids (conditioned with *hybrids*)	1000	589	58.9 ± 2.54	16.28	< 0.0001
p/g hybrids (conditioned with *pavani*)	1000	621	62.1 ± 1.92	6.63	0.01
p/g hybrids (conditioned with *gaucha*)	1000	589	58.9 ± 3.36	16.28	< 0.0001

grow of *D. pavani* and hybrid larvae. The egg-to-adult survival of *D. gaucha* is affected only by its own biotic residues. In every case, the lower viability was observed when the pre-adults were reared in food media conditioned by biotic wastes of their own kind. This last result bears a certain resemblance to other observations that indicate that, in the *Drosophila* genus, larvae of different genotypes, when grow in media conditioned by their own genotype, tend to decrease their viability[7]. In the present experiments, the superiority in survival of the hybrids respecting the parental species were not manifested, as was reported elsewhere[1], because fresh yeast was provided every second day to avoid food competition.

A general conclusion suggested by the experiments is that the performance of different species or genotypes under competitive conditions cannot be predicted exclusively on the basis of food exploitation, or other simple models. The interactions between species or genotypes are more complex, and the competitive success depends on the kind of interference in each particular circumstance.

Resumen. Los productos de desecho larval de las especies neotropicales *Drosophila pavani*, *D. gaucha* y sus hibridos estériles, inhiben el desarrollo de las larvas de *D. pavani* y los hibridos. El desarrollo de *D. gaucha* es afectado solo por sus propios residuos metabólicos. La viabilidad más baja se obtuvo cuando los preadultos se crian en medios alimenticios contaminados por sus propios desechos metabólicos.

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Polymorphisme biochimique chez la Caille japonaise (*Coturnix coturnix japonica*) dans les différentes catégories fonctionnelles de protéines

Biochemical Polymorphism of Japanese Quail (*Coturnix coturnix japonica*): Comparison of Functionally Different Proteins

L'utilisation de la technique d'électrophorèse a permis d'estimer le degré de variabilité génétique dans le cas d'un certain nombre d'espèces[1]. Toutes ces estimations proviennent pour chaque organisme de l'étude de la proportion des variants biochimiques à l'intérieur d'un petit nombre de protéines ou d'enzymes théoriquement prises au hasard. GILLESPIE et KOJIMA[2] ont montré que, chez *Drosophila ananassae*, les enzymes intervenant dans la glycolyse et le cycle de l'acide citrique (enzymes «critiques») étaient moins variables que les enzymes considérées comme non-spécifiques (enzymes «périphériques») telles que les estérases, les phosphatases et la déshydrogénase alcoolique. Par la suite des constatations voisines ont pu être effectuées chez d'autres espèces de drosophile[3–5].

La caille japonaise présente un très important polymorphisme biochimique[6–8]. Nous rapportons dans cette note la comparaison de la variabilité des protéines et enzymes appartenant à différentes classes d'activités.

Matériel et méthodes. L'étude porte sur des femelles adultes provenant d'une population d'élevage de grand effectif maintenue génétiquement hétérogène par accouplements systématiques entre individus non-apparentés et rotation hebdomadaire des mâles. La technique utilisée est l'électrophorèse horizontale sur gel d'amidon en

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