Ribera, I.L. University of Santiago de Compostela, Santiago, Spain. A Study of the influence of r and K reproductive chromosomal arrangements O_{st} and O_{3+4+7} of chromosome O of Drosophila subobscura.

The purpose of this work is to contribute to the revision of the ideas which have been advanced about rigid and flexible chromosomal polymorphism, since Dobzhansky (1962) first proposed and defined these terms.

To do this, we have studied the influence of the reproductive strategies r and K on the arrangements O_{st} and O_{3+4+7} of the chromosome O of Drosophila subobscura.

Among populations which had responded differentially to these strategies over a period of nineteen generation in a variable temperature (v), no difference in response was observed when a change in strategy was induced in these populations. We attributed this result to a loss of genetic variability in the chromosomal arrangements, caused by the special conditions of selection in the laboratory. Next, the populations were mixed in order to generate new variability by recombination. When the populations were again subjected to the reproductive strategies r and K, a differential response was observed favoring the arrangement O_{3+4+7} with strategy vr, and favoring the arrangement O_{st} with strategy vK.

These results were consistent with those already observed in the original populations, and led us to conclude that the polymorphism of chromosome O for the arrangements O_{st} and O_{3+4+7} does not meet the conditions established by Dobzhansky to allow it to be categorized as rigid.

References: Dobzhansky, T. 1962, Am.Nat. 96:321-328; MacArthur, R.A. & E.O. Wilson 1967, Princeton Univ. Press, N.J.; Pianka, R.E. 1970, Am.Nat. 104:592-597; DeFrutos, R. 1978, Genetica 49,2/3:139-151; Taylor, E.C. & C. Condra 1980, Evolution 34:1183-1193.

Robertson, J.P., H.K.Kaya & J.B.Boyd. University of California, Davis, USA. Microsporidian strikes again--a further warning.

In the Fall of 1982 several mutant stocks of Drosophila melanogaster that had developed poor fertility were found to contain flies with bloated abdomens. Giemsa staining (Hazard et al. 1981) of smears obtained from larvae, pupae, and flies revealed the vegetative stage (schizonts) and spores of the intracellular parasite Nosema. A similar infection was reported in 1957 by Wolfson, Stalker and Carson in which they state: "Infected individuals can be recognized, upon dissection in saline, by the presence of spores in the tissues and body fluid. The spores are easily identified by their strikingly consistent size and shape and by an extremely thick and rigid capsule. They are ovoid in shape, 4-5 μ in length, and may occur singly in the body cavity or associated with tumor-like structures." Subsequent referenes which have been particularly helpful in dealing with this problem include: Stalker & Carson 1963; Armstrong 1977; Burnett & King 1962; Kramer 1964; and Hazard et al. 1981. In particular, care must be taken to avoid confusing Nosema spores with intestinal yeast.

The extent of infestation in our stocks was monitored by squashing those flies with the largest abdomens in a drop of physiological saline. Phase contrast microscopy reveals high spore concentrations in infected flies once they have reached 1-2 weeks of age. This survey revealed that 30% (6/21) of all mutant stocks carried in bottles were infected, but no Nosema was detected in 25 vial stocks. Within a single infected mutant stock, between 25-100% of the individual bottles contained infected flies. This pattern of infection suggests that the fly-handling equipment is the primary vehicle of transmission, since vial stocks are transferred directly whereas the bottle stocks are frequently anesthetized.

Thus far we have been unable to eliminate this protozoan with Fumidil B as has been done in the case of a Nosema kingi infection in Drosophila willistoni (Armstrong 1976). Although a strong uninfected stock survived the treatment, flies in weak or infected stocks seem to be more sensitive than the microsporidian. Fortunately we have been able to rescue all mutant stocks by selective elimination of contaminated cultures. This has been accomplished by regular sterilization of the fly-handling equipment with heat or 1-2% sodium hypochlorite. At present our first indicator of infection is the presence of distended abdomens in older flies. Although reduced fertility is a frequent sign of infection, infected flies can exhibit reasonable fertility.

References: Armstrong, E. 1976, J.Invert.Path. 27:363; Armstrong, E. 1977, Z.Parasitenk. 53:311; Burnett, R.G. & R.C. King 1962, J.Insect Path. 4:104; Hazard, E.I., E.A. Ellis & D.J. Joslyn 1981, pp 163-182 in Microbial Control of Pests and Plant Diseases 1970-1980 (Burges, Ed.) Academic Press; Kramer, J.P. 1964, J.Insect Path. 6:491; Stalker, H.D. & H.L. Carson 1963, DIS 38:96; Wolfson, M., H.D.Stalker & H.L. Carson 1977, DIS 31:170.

Ruiz, A. & J. Alverola. Univ. Autonoma de Barcelona, Spain. Lack of evidence of embryonic mortality in the progeny of Drosophila buzzatii females heterozygous for included inversions.

Natural populations of Drosophila buzzatii are polymorphic for several overlapping inversions on the second chromosome and one simple inversion on the fourth chromozome (Fontdevila et al. 1981, 1982). The most widespread second chromosome arrangements are standard (st), j and jz^3, the first two arrangements being the most frequent in every population. The frequency of the 2 jz^3 arrangement is in general low (ranges from zero to 0.296 with a mean value of 0.080) and is negatively correlated with that of the standard arrangement ($r=-0.45$; $P<0.05$). One way to explain this correlation is to postulate a selective force acting against 2 jz^3/st heterozygotes due to the deleterious effect of crossing-over associated with included inversions. In fact, inversion 2 z^3 includes the region occupied by inversion 2 j (Wasserman 1962) so in both, the standard and the jz^3 arrangements, the j segment is oriented in the same direction. In 2 jz^3/st heterozygotes, crossing-over within the limits of this segment (which constitutes 27% of the total length of the chromosome) must produce aneuploid gametes carrying duplications and deficiencies, thus leading to a reduced fertility (Sturtevant 1938; Wallace 1953).

Table 1. Number of hatched (HT), dead (DD) and unfertilized eggs (UF) in the progeny of the nine different genotypic combinations.

female	male		day 1	2	3	4	5
st/st	st/st	HT	288	284	255	292	259
		UF	103	98	136	97	131
		DD	9	18	9	11	19
	jz^3/st	HT	300	311	303	306	279
		UF	93	79	75	85	103
		DD	7	10	22	9	18
	jz^3/jz^3	HT	297	330	297	310	303
		UF	90	57	89	78	81
		DD	13	13	14	12	16
jz^3/st	st/st	HT	371	368	371	362	369
		UF	28	28	23	29	27
		DD	1	4	6	9	4
	jz^3/st	HT	364	385	391	391	388
		UF	24	11	5	5	9
		DD	12	4	4	4	3
	jz^3/jz^3	HT	382	386	385	384	382
		UF	16	6	10	10	14
		DD	2	8	5	6	4
jz^3/jz^3	st/st	HT	342	357	378	377	379
		UF	23	25	18	16	13
		DD	35	18	4	7	8
	jz^3/st	HT	343	349	375	370	377
		UF	29	29	14	16	18
		DD	28	22	11	14	5
	jz^3/jz^3	HT	370	382	382	366	373
		UF	17	7	6	22	20
		DD	13	11	12	12	7

In order to test this hypothesis, mortality among the eggs laid by 2 jz^3/st heterozygous females was compared to that of st/st and jz^3/jz^3 homozygous females. Two strins of Drosophila buzzatii were used. Strain C-11 is homozygous for the standard sequence in both the second and the fourth chromosomes. Strain PDO is homozygous for the 2 jz^3 arrangement and polymorphic for inversion 4 s on the fourth chromosome. The two strains were derived from wild females collected in Adeje and Pingado, respectively, both localities situated in the Island of Tenerife (Fontdevila et al. 1981). Individuals of the three second chromosome genotypes (st/st, jz^3/st, $jz^3.jz^3$) were mass crossed in the nine possible combinations. For each combination, 100 one-to-three day virgin females were placed with 100 males of the same age in an egg collecting chamber. A sample of 400 eggs was picked up each day, up to five days, and allowed to hatch on a Petri plate with 1.5% agar. The eggs were examined three days after the collection and scored as hatched, dead or unfertilized. Dead embryos turn brown while unfertilized eggs remain white (Riles 1965; Curtsinger 1981).

The results of the observations are shown in Table 1. A three-way factorial analysis of variance (Sokal