in a different way from the usual. One possible explanation for this could be that ultrasonication alters the chemical and/or physical properties of the chromosomal DNA structure or composition.

Although this work took place in vitro and salivary glands were used, these findings require further attention because ultrasonics are utilized in research and applied science such as obstetrical medicine.

Reference: Strickberger, M.W. 1962, in: Experiments in Genetics with Drosophila, ch. 18, p. 103, John Wiley & Sons, Inc., New York-London.

Turner, M.E. University of Georgia, Athens, Georgia. A laboratory overwintering experiment with D. montana and D. pseudoobscura.

Drosophila which live at high elevations are subject to low temperature extremes during the winter months. At elevations 7000 ft. and above low temperatures and/or snow cover may last six months or longer. For these populations of Drosophila to persist either some stage (or stages) of the life cycle must overwinter or a new population must be founded each spring from lower elevation populations of the same species. D. montana and D. pseudoobscura were tested to determine their ability to endure cold temperatures for an extended period of time. D. montana were obtained from the University of Texas Stock Center (#1218.8d); this strain was originally captured from Ogden, Utah and has been in the laboratory since 1941. The D. pseudoobscura were collected from American Fork Canyon, Utah (elev. 7550) in 1976.

Flies were kept in half-pint milk bottles containing cornmeal-molasses medium. Approximately 50 adults were put in a bottle and allowed to reproduce at 15°C; when pupae appeared the bottles including the parents were put in an incubator at -2°C.

After eight days all D. pseudoobscura adults were dead. These bottles were moved to 15°C and no progeny from the original adults appeared; apparently the cold temperature had also killed eggs, larvae and pupae. D. pseudoobscura can be kept at 5°C for long periods of time with larvae, pupae and adults surviving.

After six months (184 days) the montana bottles (adults still alive) were removed from the incubator, adults were separated by sex and put in new bottles at 15°C. No flies had hatched from the original bottles after one month at 15°C and no living larvae were observed. The other life stages (eggs, larvae, and pupae) had been killed by the cold temperature. Additionally no larvae appeared in the bottles containing surviving females after one month at 15°C. The sexes were combined in a new bottle and larvae, and eventually adult progeny, appeared. The time at the cold temperature had despermed the "overwintering" females, but had not, at least grossly, affected their fertility.

The ability of montana adults to survive this temperature (-2°C) for an extended period of time (6 months) would seem to imply that adults can and probably do overwinter. The death of the pseudoobscura individuals does not demonstrate that they do not overwinter, but only that they may overwinter where temperatures do not get this cold. In many forest environments at or above 7000 ft. elevation both montana and pseudoobscura live in the same area and are attracted to the same banana baits. The greater cold temperature tolerance of montana adults should allow them to survive in the more exposed and colder areas of this environment.

Valente, V.L.S., C.C.R. Saavedra, A.M. de Araújo and N.B. Morales. Universidade Federal do Rio Grande do Sul, Porto Alegre, R.S., Brasil. Observations on the attraction of Drosophila species for different baits and chromosomal polymorphism in D. willistoni.

Present data were obtained in three days of collection from October to November 1978, in the locality of Estação Experimental Agronômica de Guaíba, Guaíba County, 40 km from Porto Alegre, the capital of the State of Rio Grande do Sul, Brasil. The studied place is a brushwood enclosed in a capon, with some watersheds. Five fermented banana baits were used besides natural available baits: fermented fruits fallen around the original plant, the native palm-tree Arecastrum romanzoffianum (Palmae), which fruit is commonly called "coquinho".

The collection methods were: (1) capture of adults with nets over the two types of baits; (2) collection of two samples of 100 fruits individually placed in tubes with cultural medium in a controlled temperature chamber at 25°C ± 1°C for 15 days until metamorphosis of the pre-adult forms from nature was completed. In each of these samples, only 19 and 15% of the fruits were not colonized by Drosophila species.

Table 1. Numbers and percentage of Drosophila species from Guaíba.

	Collection method							
	Net (flying adults)				Rotting fruits (pre-adults)			
	Banana		"Coquinho"		"Coquinho"		Total	
Species	N	%	N	%	N	%	N	%
D. willistoni	51	8.02	574	21.87	169	14.54	794	17.95
D. simulans	477	75.00	1515	57.71	622	53.53	2614	59.10
D. griseolineata	17	2.67	226	8.61	-	-	243	5.49
D. guaramunu	14	2.20	88	3.35	-	-	102	2.31
D. polymorpha	34	5.35	108	4.11	8	0.69	150	3.39
repleta group	6	0.94	60	2.29	354	30.46	420	9.50
Others*	37	5.82	54	2.06	9	1.42	100	2.26
Total	636		2625		1162		4423	

*These numbers are relative to species whose frequencies were less than 1% individually as: D. cardinoides, D. bandeirantorum, D. immigrans, D. nebulosa and D. fumipennis.

Table 1 shows the numbers and percentages of the different species of Drosophila found in the samples. It is interesting to note that D. simulans is by far the most abundant species, irrespective of the collection method, followed by D. willistoni. As for the repleta group, the high frequency found when rotting fruits were used illustrates clearly the difference between oviposition site and the feeding sites of adults.

In order to test the homogeneity of the species distribution of flying adults, two types of baits - banana and "coquinho" - a chi-square test was made. The differences between the two samples were highly significant, with a value of $\chi^2 = 110.88$ ($P < 0.001$); this was due mainly to the different attractivity exerted by the two types of baits on D. willistoni, D. simulans and D. griseolineata, as far as food source is concerned.

Differences between fauna ecloded from "coquinho" and that captured with nets on the same trophic resource were compared by using the Kolmogorov-Smirnov test since there were null classes in the sample ecloded from "coquinho".

The maximum deviation between these two samples reached a value of 0.2837 which is highly significant ($P < 0.001$). This result points out that not all the females attracted by the fermentation of "coquinho" actually oviposit in the fruits, which can probably be attributed to genetic differences. Another explanation for this situation would be the occurrence of high selective pressures at the larval phase, the exploration of food resource being one of the more effective. Nevertheless we believe we attenuated the conditions for food competition by putting each fruit individually in a tube with culture medium and dilute bread yeast.

Table 2. Statistical significance of the differences in chromosomal rearrangements of D. willistoni among samples collected in banana baits, and those attracted and ecloded from Arecastrum romanzoffianum fruits ("coquinho").

	II L rearrangements		III rearrangements	
	single	complex	single	complex
Samples	P	P	P	P
banana x "coquinho" (collected with nets)	N.S.	<0.05	N.S.	N.S.
"coquinho" x "coquinho" (ecloded from rotting fruits and attracted from the same fruit)	N.S.	N.S.	N.S.	<0.01

P = probability; N.S. = not significant

As was previously stated, D. willistoni is one of the most abundant species and also presents differences concerning attraction for the different baits. That is why it has been chosen

for the evaluation of genotypical differences through the chromosomal polymorphisms, as had already been described by Dobzhansky (1950), da Cunha (1957), Cordeiro (1954) and others.

The progeny of each female captured in nature was analyzed in relation to the larval salivary gland chromosomal rearrangements, by the technique of Ashburner (1967); the same was applied to the progeny of females ecloded from "coquinho" fruits fecundated by males ecloded from the same fruit.

The analysis of 363 individuals showed that of the five chromosome arms, X L, X R and II R were homozygous. As for the left arm of the second chromosome (II L), the Kolmogorov-Smirnov test showed that the differences between the F_1 of females collected from banana and "coquinho" baits were significant ($P < 0.05$) for combined rearrangements (two to four inversions together). For the third chromosome (III) there were significant differences between the offspring of females captured with nets over the fruits of Arecastrum romanzoffianum and the offspring of females ecloded from these fruits in the laboratory, when combined rearrangements were considered (two to three inversions).

The results of the statistical test to the chromosomal rearrangements are summarized in Table 2. The total number of rearrangements observed for II L chromosome was 17, 6 of which were single rearragements (only one inversion) plus the homozygous; 11 were combined rearrangements (two to four inversions together), with a frequency different from those of each inversion separately, although most of these inversions being located far enough in the chromosome as to permit the occurrence of crossing over between them.

Four single rearrangements were found for the third chromosome, including the homozygous, as well as four complex rearrangements, representing two and three inversions. Among the combined rearrangements of II L, for example, whereas D, E, B/d, e, b reached a frequency of 54.1% in banan baits, it was not found in larvae of females ecloded in "coquinho" and attained 45.8% in larvae from females attracted by the fruit; F, D, E, B/f, d, e, b reached 77% in banana baits, 22% in the natural one as was not found in larvae of females ecloded from the native fruit.

Among the third chromosome complex rearrangements, J, B/j, b was 22.3% in larvae from females attracted by banana, 2.12% in larvae from flies ecloded from "coquinho" and 75.5% in larvae attracted by this same fruit; the B, C/b, c rearrangement reached 0%, 41.6% and 58.3%, respectively, in the offspring of the same samples and the J, B, C/j, b, c rearrangement was exclusive of larvae from flies ecloded from "coquinho" fruits. This indicates a clear association of certain types of rearrangements with the kind of explored trophic resource.

References: Ashburner, M. 1967, Chromosoma (Berl.) 21:289-428; Cordeiro, A.R. 1954, Bol. Instituto de Ciências Naturais 1:5-54; da Cunha, A.B. 1957, Bol. Fac. Fil. Ciên. e Letr. Univ. São Paulo #220, Biologia Geral 10:1-56; Dobzhansky, Th. 1950, J. Heredity 41:156-158.

van Delden, W. and A. Kamping. University of Groningen, The Netherlands.

Selection against an Adh null allele.

Several null mutants of the alcohol dehydrogenase (Adh) locus in D. melanogaster are known. Homozygotes for these mutants, which lack detectable ADH activity, can be maintained as laboratory strains without culture problems when kept on regular food. On ethanol-supplemented medium, however, they lack detoxification ability and die quickly compared to ADH-positive flies. As we have found (van Delden et al. 1978) that selection occurs also on regular food in populations polymorphic for the naturally occurring Fast (F) and Slow (S) alleles we studied whether in populations polymorphic for a null mutant and either F or S alleles, selection would occur against the null allele. For this purpose the Adh^{nl} (0) mutant (Grell et al. 1968) was introduced into the background of the Groningen population, whereafter 0 x S and 0 x F crosses were made with S and F strains possessing the same background. The offspring of these crosses (F_1) were put in population cages at 25°C. The populations were continued in time and allele frequencies were determined at intervals beginning with the F_2 generation. Populations were started both on regular and ethanol-supplemented food. Table 1 lists the observed null allele frequencies, populations indicated as S0 and F0 are polymorphic for the null allele and S and F alleles respectively. To study the importance of strain effects, five S0 and five F0 populations were started, both on regular and ethanol-supplemented food. Populations numbered up to four inclusive each contained two S or F lines which differed from the lines used in the other three populations; populations numbered five contained all eight lines S or F lines used in the other four populations of the same type.