Genotype	Number of cells	Anaphase + telophase: Double bridges	Inter-locks	Total bridges	% bridges	Lagging	Other
1. X^{c2} (unaged)	150	1	8	9	6.0	1	1
2. X^{c2} (aged)	161	9	18	27	16.8	2	1
3. $X^{c2}{}_{w}{}^{vc}$	317	6	4	10	3.1	3	5
4. $del(1)x^{c2}$	118	0	0	0	0	3	0
5. MYR	225	7	2	9	4.0	0	4

Nagle, James J. North Carolina State University, Raleigh. A study of intra- and interspecific polymorphism.

Chromosomal polymorphism has recently been found in populations of Race B of D. mojavensis which occur in Baja, California and Sonora, Mexico (DIS 38:58). This polymorphism involves Chromosome pairs 2 and 3 of the six constituting the karyotype of the species. In Chromosome 2 a simple paracentric inversion distinguishes the Standard (ST-2) from the LaPaz (LP) banding sequence, and a simple paracentric inversion in Chromosome 3 distinguishes the Standard (ST-3) from the Mulege (MU) arrangement. Analyses made from recent collections (courtesy of Dr. W. B. Heed) and from laboratory populations established from previous collections revealed ST-2 to be in low frequency (5-10%), while ST-3 and MU occurred in about equal numbers.

Two cage populations were initiated with equal proportions of males and females of D. mojavensis (Race B) and D. arizonensis, a closely related species. Cytological analyses indicate that mojavensis is replacing arizonensis, although limited hybridization (2-5% recombinant types per generation) is occurring. The intraspecific polymorphism of mojavensis has been maintained over the period of competition with arizonensis. The mean percentage of the second and third chromosome types within mojavensis, based on thirteen samples of each population (over 750 days), is given in Table 1.

Table 1. Mean percentages of the second and third chromosome types of mojavensis.

Chromosome Number	Banding Sequence	Percentage: Population 1	Population 2
2	ST-2	4.7	9.6
2	LP	95.3	90.4
3	ST-3	47.8	48.5
3	MU	52.2	51.5

A third population was initiated with male and female F_1 interspecific hybrids. In this case the chromosomes of mojavensis were obligatorily in heterozygous combinations with those of arizonensis at the beginning of the population. Table 2 gives the percentage of mojavensis second and third chromosomes observed in ten samples of the "hybrid" population. The proportions of ST-2 and LP have remained near the equilibrium frequencies observed in the mojavensis stocks, as given above. On the other hand, the percentages of ST-3 and MU deviate significantly from the 50-50 proportions observed in the laboratory populations of mojavensis (Table 1). Specifying no selection, the F_1 was expected to consist of equal amounts of ST-3/AR-3 combinations. The large deviation from this expectation, especially in the earlier samples, indicates that the combination ST-3/AR-3 has a much higher adaptive value than MU/AR AR-3. These data support the concept of fitness relativity, as put forth by Levene, Pavlovsky and Dobzhansky (1954, 1958). The intraspecific polymorphism, presumably based on heterosis of the ST-3/MU heterokaryotype, is greatly upset when subjected to a new genetic milieu; a novel chromosomal homologue, AR-3, is superimposed upon the intraspecific polymorphic system through hybridization. A new polymorphic condition is now being approached, seemingly due to ST-3/AR-3 heterokaryotypic superiority, with the apparent elimination of the MU arrangement despite any advantage it has in combination with the ST-3 chromosome.

Table 2. Percentages of mojavensis second and third chromosomes observed in the "hybrid" population.

Sample Number	Percent Chromosome 2		Percent Chromosome 3	
	ST	LP	ST	MU
1	6.4	93.6	80.1	19.9
2	6.7	93.3	89.0	11.0
3	5.4	94.6	84.7	15.3
4	4.0	96.0	87.6	12.4
5	4.8	95.2	90.8	9.2
6	3.8	96.2	90.3	9.7
7	4.7	95.3	92.9	7.1
8	2.6	97.4	88.8	11.2
9	5.9	94.1	91.5	8.5
10	4.8	95.2	96.5	3.5

Heed, W. B. and R. W. Jensen. University of Arizona. Drosophila ecology of the Senita cactus, Lophocereus schottii.

D. pachea breeds in the rotting stem of senita cactus where it obtains the sterol, schottenol, for growth and reproduction. Other species of desert-adapted Drosophila do not breed in the stem of senita because it contains factors which are toxic to them (Heed and Kircher, Sci., Aug. 1965). The following bioassay is to determine the growth characteristics of Drosophila on the fruit of this unusual plant. Two different strains each (one strain repeated in mojavensis) of five species of Drosophila, which regularly inhabit the Sonoran Desert, were tested for reproductive ability by dividing one vial of mature egg-laying adults from each strain into two. One vial of standard banana media was supplemented with a cube of sterilized fruit and the other with a cuve of sterilized stem. In this way from 40 - 60 flies were tested per vial against their sibs. The number of progeny are recorded in the table.

	pachea		pseudoobscura		arizonensis		mojavensis		nigrospiracula	
	A	B	A	B	A	B	A	B	A	B
Stem	215	183	127	40	74	71	49	41	13	28
Fruit	110	58	161	96	257	255	179	294	37	94

D. pachea performs better on the stem than the fruit. The four other species perform better on the fruit, one reason being that the parents were killed in the stem vial. The time when 50% of the adults were killed was 7 days for pseudoobscura, 12 days for arizonensis and mojavensis and 25 days for nigrospiracula. Very few parents of any species, including pachea, were dead when they were removed from the fruit vials to avoid overlapping of generations. However, since the larval density was high in both fruit and stem vials in all species, there was also a high degree of larval and/or pupal deaths due to the stem. The low number of progeny from both tests in strain A of nigrospiracula reflects an unexpected unequal sex ratio in favor of the males. All progeny from all tests were fertile (produced larvae) on non-supplemented standard banana media in varying degrees. In the case of pachea the progeny from the fruit vials in one week layed 1/4 to 1/10 as many eggs as equal numbers of progeny from the stem vials, for instance: 73 vs 1,120 and 95 vs 425 eggs.

It is concluded from the performance of pachea that the fruit of senita contains either a very small amount of the sterol, schottenol, or a slightly different sterol. It is known from previous tests that pachea will not complete a full generation on banana food without supplementation either with the stem of senita or with schottenol or closely related sterols. One sterol ($\Delta^{5,7}$ stigmastadien 3-β-ol) is known to allow growth but not egg production. It may also be concluded that the fruit does not contain toxic factors to any appreciable amount. Both arizonensis and nigrospiracula have been reported associated with the fruit of senita in nature. From the present tests one may confidently predict that pachea does not breed in the fruits of senita in the Sonoran Desert.