Table 3. Temperatures in °C at the Carboneras weather station "Central Termica" as measured from 1986 - 1995. Data from January are given, because it is the coldest month on the average.

Month	Mean temp.	Mean Max.	Mean Min.	Absol. Max.	Absol.Min.
June	22.3	25.6	18.9	34.5	9.5
July	25.5	28.5	22.4	41.6	12.5
August	26.5	29.6	23.3	39.3	16.3
September	23.8	26.9	20.7	33.6	9.4
October	19.8	23.1	16.5	32.5	9.4
November	16.6	19.8	13.3	28.6	5.3
December	14.0	17.1	10.8	23.9	5.0
January	12.4	15.8	8.9	24.4	-4.5

The mean year temperature over ten years was 18.7 °C.

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Eisses, K.Th., and M. Santos. Universitat Autònoma de Barcelona, Departament de Genètica i de Microbiologia, 08193 Bellaterra (Barcelona), Spain. Hybrids between *Drosophila melanogaster* and *D. simulans* in a Spanish natural population.

The sibling species *Drosophila melanogaster* and *D. simulans* coexist in natural conditions in various abundances. The siblings are so closely related that it took a while until the two species were distinguished as such (Sturtevant, 1919). Interspecific matings can easily be provoked in laboratory conditions and used as a tool for studying processes of speciation (*e.g.*, Davis *et al.*, 1996). We screened field populations for these species because of ecological and genetical reasons and used gel electrophoresis as a tool, which method revealed an approximation of the frequency of interspecific hybrids between *D. melanogaster* and *D. simulans*. Data about frequencies of such hybrids in natural populations are very scarce.

Flies were captured with mashed banana traps during five days in Carboneras (Almería, Spain; 37°00'N; 1°53'W) and other locations up to 10 km north and south (Eisses and Santos, 1997). *Opuntia ficus-indica* fruits (prickly pears) were put in an experimental design for almost seven days in a semi-abandoned *O. ficus-indica* plantation near Carboneras. After recollection of the fruits emerging flies were aspirated. Captured and emerged flies were checked for *D. melanogaster* morphology and frozen at -29°C until gel electrophoresis and staining for alcohol dehydrogenase (ADH; EC 1.1.1.1.), which is a diagnostic enzyme between *D. melanogaster* and *D. simulans* (Eisses, Van Dijk and Van Delden, 1979). Gel buffer and electrophoresis buffer were according to the system of Poulik (1957).

Figure 1 shows the dimeric hybrid enzyme band between the parental ADH-S band of *D. melanogaster* and the ADH-simulans band in the lane labelled with *. However, the hybrids resulting from a cross between *D. melanogaster* ADH-Fast and *D. simulans* did not show a dimeric hybrid enzyme band. In these cases only the parental ADH-bands were visible on the gels (not shown on photograph). We do not know whether these hybrid dimers do not exist or are inactive. Four female hybrids were found, three of them were ADH-Fast/ADH-simulans. One of the hybrids was found among 137 captured *D. melanogaster* flies in Llano de Don Antonio. One natural hybrid on a total of 425 captured females in the wider Carboneras area means a frequency of 2.4×10^{-3}. Three interspecific hybrid females among 1096 females, emerging from prickly pears in the Carboneras *O. ficus-indica* plantation in September 1995, means a frequency of 2.7×10^{-3}. *D. simulans* was approximately three times more abundant than *D. melanogaster* in this area of Spain in this time of the year (Eisses, Laayouni, Leibowitz, Santos and Fontdevila, unpublished results).

The frequency of hybrids in the Carboneras population with 2.7×10^{-3} was about 2.5 times lower than the frequency reported in a Barcelona population (Mensua and Pérez, 1977). Much higher frequencies have been reported for natural populations and ranged from 1 to 40% (Casares and Carracedo, 1985; Inoue *et al.*, 1990; Sperlich, 1962).

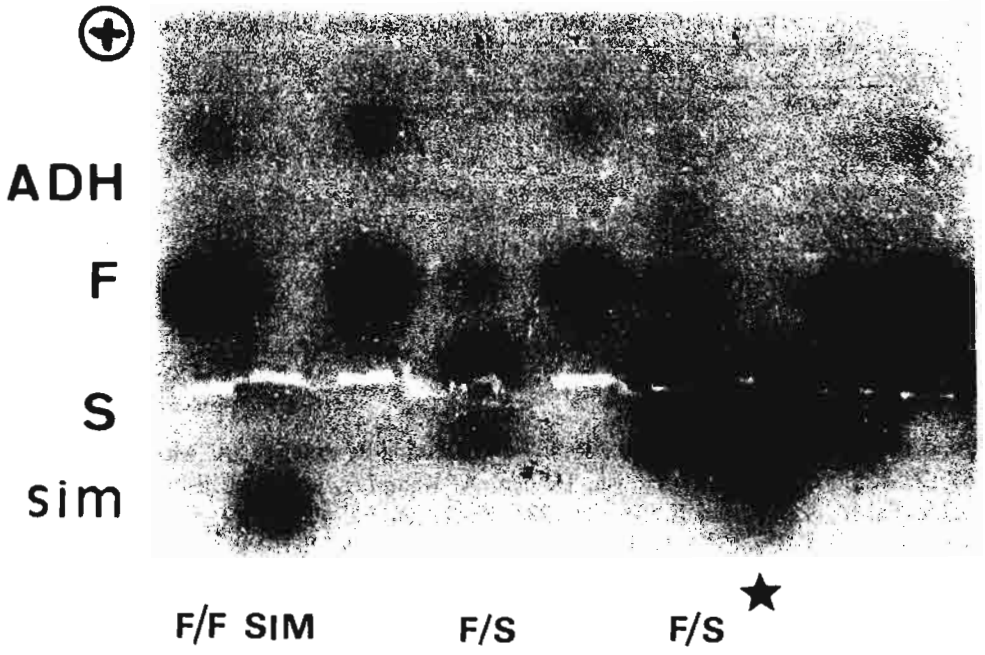

Figure 1. Electrophoresis of alcohol dehydrogenase isozymes ADH-F/F, ADH-F/S of *D. melanogaster* and *D. simulans* adults. The ADH pattern from the hybrid between *D. melanogaster* ADH-S and *D. simulans* is in lane labelled (*).

However, these data were based on the number of hybrid progeny of *D. melanogaster* females, inseminated by *D. simulans* males. The capture of hybrid flies in nature has not been reported often. Kamping and Van Delden (1988) found three hybrids among a total of 406 females caught in a fruit market. The frequency of hybrids in this natural population was 7.3 x 10^{-3}, which is three times higher than in our location. The Groningen fruit market population consisted less than 2% *D. simulans*. A much larger frequency of hybrids (1.4%) was found by Capy *et al.* (1987) among flies emerging from rotting grapes with relatively low alcohol contents. In that area *D. simulans* was three times more abundant than *D. melanogaster*.

Electrophoresis unequivocally reveals hybrids between the two species, so our data signify a good approximation for natural populations, although interspecific mating barriers seem to vary a lot. Sperlich (1962) described a population with hardly any barriers at all. As our estimated frequency of natural hybrids captured in the field is not essentially different from the frequency of hybrids emerging in the laboratory from fruits collected in the field, 2.5 x 10^{-3} seems a reasonable lower limit of interspecific hybrids in nature. However, this figure might be an underestimation of the hybrid frequency, because potential hybrids with a *D. simulans*-like phenotype were not involved in electrophoresis.

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