Van den Berg, M.J. University of Groningen, Haren, Netherlands. The influence of isolation during rearing on male vigor in **D.melanogaster.**

In the last decade much attention has been paid to the role female pheromones play in the mating behavior of **Drosophila melanogaster** (see Jallon 1984 or Tompkins 1984 for some recent papers). Venard & Jallon (1980) and Antony & Jallon (1982) developed a simple and straightforward bioassay, to test whether certain compounds can act as sex attractants. In their assay an adult male Drosophila is offered a dead male conspecific, which is first deprived of his own odour and then covered with the compound to be tested. The male will often show courtship behavior towards the decoy, provided that a sex attractant is applied. On using this technique I covered decoys with raw hexane soluble extracts from females, but was unable to provoke sufficient sexual behavior. The extract was made in a similar way as described by Antony & Jallon (1982), who showed that this extract functioned as sex attractant. Antony & Jallon, however, stored the males between eclosion and day of test individually, while in our experiments they were stored in groups of 25.

To test whether this difference in method was responsible for the failure to replicate the bioassay, two groups of males were tested using a decoy covered with raw female extract (the amount was equivalent with approximately 1 female). Males of one group (isolates) were stored individually in shell vials (diam. 2.3 cm, height 7.8 cm), while in the other group (socialites) the males were stored in similar vials but in lots of 25 individuals. Males of both groups had been reared as pre-adults under identical, uncrowded conditions at 25°C and were tested individually 3-5 days after eclosion. The test was done in a small mating chamber at 25°C (see Van den Berg et al. 1984 for further details). The behavior was observed continuously for 10 min using a binocular microscope (10 x magnification) and recorded on an OS3 event recorder. The behavior elements noted were: Orientation, Wing vibration, Licking and Attempting to copulate (see Bastock & Manning 1955 for detailed description).

Table 1. Mean frequencies and mean durations of the different behavior elements of the two groups of flies.

Behavior element	Isolites (n = 14)	Socialites (n = 13)	Mann Whitney U
Orientation			
frequency*	21.43	3.23	48.5 ($P < 0.05$)
duration**	70.84	13.41	50.0 ($P < 0.05$)
Wing vibration			
frequency	21.36	3.15	45.5 ($P < 0.05$)
duration	59.15	11.47	48.5 ($P < 0.05$)
Licking			
frequency	4.86	0.69	68.5 (N.S.)
duration	5.47	0.95	68.5 (N.S.)
Attempting to copulate			
frequency	0.50	0.00	71.5 (N.S.)
duration	1.00	0.00	71.5 (N.S.)

*mean total frequency. **mean duration (seconds)

Table 1 shows clearly that the isolates are much more vigorous in courting than the socialites. This explains the original failure to promote sexual behavior using Venard & Jallon's bioassay. The results presented here show clearly that attention has to be paid to possible effects on behavior caused by isolated or social storage conditions. This is particularly true when flies are to be used for single or mass mating experiments, where phenomena such as female choice or male vigor are tested, because these differences in courtship behavior are likely to affect mating success.

Several possibilities exist as to the causes for this effect. It is possible that the chemoreceptors of the males become adapted to the cuticular hydrocarbons. In this case this would have to be a process of cross adaptation, because in **Drosophila melanogaster**, male hydrocarbons differ from female hydrocarbons. Therefore adaptation is not likely to be the cause underlying the effect found here (see Van den Berg et al. 1984 for more details).

Drosophila males sometimes court each other upon encountering, but will soon stop if the partner proves to be inappropriate. In the vials with 25 males, these encounters will be numerous during the 3-5 days of storage. It is therefore possible that a negative conditioning occurs, which could result in a lower male vigor to the offered decoy during the test. It would be very interesting to test this last hypothesis further.

References: Antony, C. & J.M. Jallon 1982, J. Insect. Physiol. 28:873-880; Bastock,M. & A. Manning 1955, Behaviour 8:85-111; Jallon, J.M. 1984, Behav. Genet. 14:441-478; Tompkins,L. 1984, Behav. Genet. 14:411-440; Van den Berg, M.J., G. Thomas, H. Hendriks & W. Van Delden 1984, Behav. Genet. 14:45-61; Venard, R. & J.M. Jallon 1980, Experientia 36:211-213.