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The number and distribution of eggs laid by *D. melanogaster* and *D. hydei* is not influenced by the presence of the other species.

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Introduction

In nature, the interspecific interactions which take place within guilds of drosophilids are thought to be moderated by chance avoidance of species due to the independent aggregation of eggs between patches of resource (*e.g.*, Atkinson and Shorrocks, 1984). *D. melanogaster* and *D. hydei* have been found to interact in various ways when maintained in laboratory systems (*e.g.*, Arthur, 1986; Hodge and Mitchell, 1998; Hodge, 1999) but these previous experiments have generally been in the form of single generation experiments in glass tubes or have examined populations maintained in restricted culture cages. In the field, interactions between larvae may be abated or accentuated if females of one species tend to avoid or select sites occupied by the eggs of another. However, it is believed that the aggregated distribution of eggs produced by drosophilid females is produced independently of other species present in the guild (Rosewell *et al.*, 1990; Shorrocks *et al.*, 1990). This experiment examined how *D. melanogaster* and *D. hydei* interact, with respect to the number, distribution and success of eggs laid over an array of resource patches.

Methods

Experiments were carried out in 1.0m × 0.5m × 0.5m nylon mesh cages, maintained in an insect room at a temperature of 25°C, a light:dark cycle of 16:8 hours and a relative humidity of 35-45%. A 6 × 8 grid of small glass pots (30mm in diameter) containing food medium was placed in the centre of the cages on a plastic tray 35cm × 45cm. This gave a resource density of approximately 305 patches per m^2. Each pot contained 1.5g of Instant *Drosophila* Medium (IDM; Blades Biological, Edenbridge, Kent, UK) hydrated with 6.0ml of distilled water.

The populations used in the experiment were a white eye mutation of *D. melanogaster* Meigen and a wild-type strain of *D. hydei* Sturtevant. Single species cages were set up using 250 male and 250 female flies. Mixed culture cages used 250 male and 250 female flies of each species. Four replicates of each species and of the mixed culture treatment were set up.

The glass pots were removed from the cages after 18 hours, so the eggs could be counted before those of *D. melanogaster* started to hatch (the eggs of *D. melanogaster* and *D. hydei* are easily distinguished by the number of filaments). The degree of aggregation of eggs was estimated by calculating the variance / mean ratio and a value of k for a negative binomial distribution. The goodness-of-fit of the data to a negative binomial distribution was confirmed using a G-test.

The pots were then placed into individual plastic cups (9cm tall; 6cm diameter) with plastic screw lids. For ventilation, nine holes (4mm diameter) had been placed into the lids and then covered with nylon mesh. These cups were placed in an incubator set at 25°C, 16:8 hour light:dark cycle and a relative humidity of 35-45%. The cups were checked daily and any emerged adult flies removed.

Results

The values for mean number of eggs per pot, the variance / mean ratio, the value of *k* for the distribution of eggs, the proportion of patches containing eggs and the hatch-rate of the eggs showed no difference between mixed species cultures compared to those in the appropriate single species culture (Table 1; $P > 0.05$, ANOVA and Mann-Whitney tests). This indicates there was no effect of either species on the egg laying behaviour of the other.

Table 1. Summary of egg laying performance in single and mixed species cultures (mean ± SE; N = 4)

	D. mel	*D. mel* mixed	*D. hydei*	*D. hydei* mixed
Eggs per pot	15.9 ± 3.3	19.4 ± 5.3	14.8 ± 5.4	24.2 ± 8.6
variance / mean	24.1 ± 8.4	20.9 ± 7.7	41.1 ± 4.1	42.7 ± 15.5
k of egg distribution	0.573 ± 0.047	0.673 ± 0.223	0.137 ± 0.054	0.239 ± 0.141
Occupied patches (%)	79.7 ± 1.3	75.0 ± 10.9	37.5 ± 9.2	45.8 ± 15.8
Egg hatch rate (%)	57.55 ± 5.82	58.53 ± 5.25	33.63 ± 9.44	39.70 ± 10.60

To assess whether there was any association between the species in mixed cultures, χ^2 tests were used to examine the presence or absence of eggs within each patch (Table 2). No significant negative or positive associations between the eggs of the two species were found.

Table 2. Association of *D. hydei* and *D. melanogaster* eggs in mixed culture cages.

	Number of patches with eggs of:					
	D. mel only	*D. hyd* only	Both species	Neither species	χ 2	P
Replicate 1	19	1	2	26	0.682	>0.30
Replicate 2	18	4	19	7	0.762	>0.30
Replicate 3	21	2	21	4	0.584	>0.30
Replicate 4	8	3	36	1	0.180	>0.50

Discussion

Although the larvae of these two species interact in various ways and with varying intensity when restricted to smaller, less complex, laboratory environments, in this experiment the adults did not modify any of the parameters measured in the other species' performance. Even at these artificially high densities of adults flies, the pattern of egg laying of one species was not affected by the presence of the other. The eggs of both species tended to be highly aggregated and showed no association with those of the other species. These results agree with similar studies investigating the distribution and independence of egg laying in *Drosophila* (Rosewell *et al.*, 1990; Shorrocks *et al.*, 1990; but see Worthen and McGuire, 1988).

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Is *Zaprionus indianus* Gupta, 1970 (Diptera, Drosophilidae) currently colonizing the Neotropical region?

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On March, 20th, 1999, while walking in an orchard belonging to a ranch named *Chácara Santa Mônica*, which stands 11 km NE of Santa Isabel, in the metropolitan area of São Paulo City, state of São Paulo, Brazil, I spotted some overripe and partially eaten persimmon fruits still attached to a persimmon tree (*Diospyrus kaki* L.; Ebenaceae). Inside a large hole of one fruit, about half of its diameter and probably made by birds, I noticed, among some large beetles and wasps, several small flies moving their probosces back and forth very rapidly, apparently devouring the wet pulp. Two or three of these flies especially attracted my attention for they had a pair of white and conspicuous stripes along the submedian area of the dorsal surface of the head and thorax, an unnusual feature for the neotropic drosophilids. Immediately, I remembered that only