The groups formed by the aedeagus variation agree with the data obtained for other genetic markers, which also separate *D. buzzatii* populations of the Northeast from those of the Southeast, South in Brazil and Chaco Domain (Baimai *et al.*, 1983; Ruiz *et al.*, 1984; Barker *et al.,* 1985; Figueiredo and Sene, 1992; DeBrito *et al.,* 2002; Khun *et al*., 2003). Moreover, the aedeagus variable size was a positive correlation with latitude. These data suggest that as well as historical factors, environmental factors also influence the differentiation of aedeagus morphology in *D. buzzatii* populations (Baimai *et al.*, 1983; Ruiz *et al.*, 1984; Barker *et al.,* 1985; Figueiredo and Sene, 1992; DeBrito *et al.,* 2002; Khun *et al.*, 2003). Moreover, the aedeagus variable size presented a positive correlation with latitude. These data suggest that, as well as historical factors, environmental factors also influence the differentiation of *D. buzzatii* populations.

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Distribution of *tom*, a retrotransposon, in natural populations of *D. ananassae.*

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Introduction

Transposable elements (TE) are genomic parasites that maybe inflict detrimental mutations on the fitness of their host. A retrotransposon, *tom,* one of the TEs, is mobilized with high frequency in the germ line of females from the *ca; px* strain; mobilization of *tom* in the *ca; px* strain causes a high incidence of mutations that almost exclusively affect eye morphogenesis (Hinton, 1984; Shrimpton *et al*., 1986; Matsubayashi *et al*., 1992; Tanda *et al*., 1993). Tanda *et al*. (1988) reported that *tom* is a long terminal repeat-containing retrotransposon that encodes three different open reading frames (ORFs). We surveyed the *tom* element in genomes from natural populations of *D. ananassae* by means of *in situ* hybridization on the polytene chromosomes.

Table 1. Sites of *tom* lebeling on six chromosome arms of isofemale lines from natural populations.

Locality		No. of isofemale lines	No. of isofemale lines with *tom*	% isofemale lines with *tom* elements	Chromosome arm						No. of *tom* elements
Population	Country				XL	XR	2L	2R	3L	3R	
Nairobi	Kenya	2	2	100.0	13CD	14B		47A			3
La Nicliere	Mauritius	1	0	0.0							0
Mysore	India	2	1	50.0					81B		1
Coimbatore	India	7	4	57.1		14A	26C, 44D	48D, 61D, 62B			6
Hyderbad	India	5	3	60.0			26C			83C, 87D	3
Andaman	India	1	0	0.0							0
Kandy	Sri Lanka	4	1	25.0						87BC	1
Schwebo	Myanmer	1	0	0.0							0
Mandalay	Myanmer	4	1	25.0				45B			1
Yangon	Myanmer	1	1	100.0					64A		1
Chiang Mai	Thailand	8	4	50.0	13C		41A	48D	64A, 79AB		5
Bukit Timah	Singapore	2	0	0.0							0
Kuala Lumpur	Malaysia	6	5	83.3	11A	16D	22D, 26C	45B		83A, < >	7
Miri, Sarawak	Malaysia	1	0	0.0							0
Sandakan	Malaysia	2	2	100.0			22B	45A, 45D	81C		4
Kota Kinabalu	Malaysia	2	0	0.0							0
Palawan	Philippines	5	2	40.0			32D	45C			2
Los Banos	Philippines	7	2	28.6			36A		80B		2
Taipei	Taiwan	2	0	0.0						84C	1
Miyakojima	Okinawa, Japan	4	2	50.0			33D			84C	2
Nago	Okinawa, Japan	1	0	0.0							0
Guam	Marianas Islands	14	9	64.3	10A, 13D	16BC, 17BC		53B	64A, 65C, 72B, 77C, 81B, < >	86B, 96A	13
Wau	Papua New Guinea	6	5	83.3	12B	18A	21B, < >		65C		5
Lae	Papua New Guinea	5	0	0.0							0
Port Moresby	Papua New Guinea	5	2	40.0	13B, 13D				80CD		3
Noumea	New Caledonia	1	0	0.0							0
Ponape	Caroline Islands	5	1	20.0				40B			1
Nauru	Nauru	3	0	0.0							0
Lautoka	Fiji	5	1	20.0					81C		1
Tonagatapu	Tonga	6	2	33.3		14Ap, 14Ad	21B				3
Vava'u	Tonga	4	1	25.0			21B				1
Pago Pago	Samoa	3	2	66.7		14D					1
Honolulu	Hawaii, U.S.A.	5	0	0.0							0
Ubatuba	Brazil	15	8	53.3		15B, < >	24B	45Ap, 45Ad, 59B, 59C, 60A	80A	83B, 84A, 90A, 90C, 92AB, 96A, < >	16
Total		145	61	42.1	7	11	11	16	11	14	83

< >: The precise position on the chromosome not determined

Materials and Methods

A total of 145 isofemale lines of 33 populations from east Africa, India, southeast Asia, Papua New Guinea, and Brazil were used in the present study and are listed in Table 1. These materials were also used in the previous survey of inversion polymorphisms (Tomimura *et al*., 1993). Flies were cultured at 25ºC in 3 × 10 cm glass vials containing a standard cornmeal-yeast-glucose-agar medium. *In situ* hybridization was carried out mostly following Shrimpton *et al*. (1986), except that the biotinylated probe DNA was detected by a normal detection kit. A probe of the *tom* element used in the present experiment, either λs9.6 or λ9.15, was provided by C.H. Langley. The polytene reference map of *D. ananassae* (Tomimura *et al*., 1993) was used to determine the insertion sites of the *tom* elements in the chromosomes.

Results and Discussion

The experiment demonstrated that the *tom* element was inserted into chromosomes of isofemale lines from 22 tropical and neo-tropical populations. Chromosomes from 61 out of 145 isofemale lines showed 1 to 4 sites hybridized by the *tom*-bearing probe, but the other 84 strains had no labeling sites (Tables 1 and 2). The insertions were distributed from 7 to 16 sites in euchromatic regions of all the arms of the polytene chromosomes. In total, 83 bands on the salivary gland chromosomes contained *tom* element insertions. Most of these insertion sites were unique to each population, although several sites, 13D, 21B, 26C, 45B, 48D, 64A, 81C, and 84C, were hybridized by the *tom* elements in two or three populations. These results suggest that the *tom* element is active and inserts into euchromatic regions. As shown in Table 2, however, the number of insertion sites found in isofemale lines established from natural populations was lower than those in *Om* and *Om*-related strains, including the *ca; px* strain. The *tom* insertions found in natural populations did not lead to any detectable phenotypic abnormalities.

Four related species, *D. pallidosa*, *D. parapallidosa*, *D. papuensis*-like, and *D. pallidosa*-like-WAU, showed no *tom* insertion sites in their salivary gland chromosomes (data not shown).

Table 2. Number of *tom* elements detected by means of *in situ* hybridization to salivary gland chromosome.

Strains		Total number of strains	Total number of *tom* element	Range of number of *tom* elements per strain	Average number of *tom* elements per strain
Isofemale lines	Isofemale lines without *tom* elements	84	0	0	0
	Isofemale lines with *tom* elements	61	112	1~4	1.42
	Total	145	112	0~4	0.63
Om strains*		19	150	5~15	7.89

Data from Matsubayashi et al. (1992)

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Drosophila collection in Los Angeles, California.

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Drosophila collections are important for understanding the distribution of species (Patterson, 1943). Unfortunately, few scientists can properly identify all the species in their collections; therefore, investigators retain only key species and discard the rest usually without a published record. Here, we document our collections from October to December, 2010, in the Los Angeles metropolitan area. We used seven day-old fermented bananas for baits (Carson and Heed, 1983), and we introduced 300 grams of fermented banana mixture into a 1-liter, green plastic bottle with a wide mouth (a method modified from Markow and O'Grady, 2006). We set > 100 baits in parks or close to trash collectors in market plazas. Fifty-six of our baits were lost or distressed; thus, we recovered flies from 54 stations (Table 1).

Table 1. Species composition percentage for the Drosophilidae individuals collected in 54 areas in Los Angeles Metro Area, California, October to December, 2010.

Species	Percentage
D. simulans	69.71%
D. immigrans	14.56%
D. melanogaster	8.08%
S. lebanonensis	1.90%
D. busckii	1.24%
D. repleta	1.19%
D. hydei	1.02%
D. suzukii	0.68%
D. pseudoobscura	0.47%
D. mainlandi	0.36%
D. mercatorum	0.30%
D. wheeleri	0.23%
Z. indianus	0.09%
D. virilis	0.07%
D. macrospina	0.05%
D. funebris	0.02%
D. malerkotliana	0.01%

We collected flies from baits on site after a 5-8 day period, and we immediately sorted the flies to sex and transported them back to our UCLA laboratory. There we identified individuals to species. We set up isofemale lines for all *Drosophila melanogaster*, which was our target species, and for all melanogaster group females that we could not distinguished from *D. simulans* (Watada, personal communication).

We collected 9,524 Drosophilidae flies distributed across 17 species. Table 1 shows the percentage of species collected. Two species, *D. wheeleri* Patterson and Alexander 1952 and *D. mainlandi* Patterson 1943, are endemic to California. The other 15 Drosophilidae species are cosmopolitan or semi-cosmopolitan. Two species, *Zaprionus indianus* Gupta 1970 and *D. suzukii* (Matsumura, 1931), are introduced pest-species. During the collection period, we spoke with USDA agents in the field. They were using the organic insecticide Spinosad to control the true mediterrean fruit fly *Ceratitis capitata*. However, this chemical apparently had a negative impact on our collections, too. Table 2 shows the bait location, species, and numbers collected by bait. Thirty-seven percent of the collected flies were females. Seventy-nine percent were in the subgenus *Sophophora* Sturtevant 1939, 17.8% in the subgenus *Drosophila* Duda 1923, 1.2% in the genus