That is why one may conclude that the gene *Trl* has its peculiarities (in particular, a heightened level of dominance of lethal effect in heterozygotes) which still require confirmation and explanation. Besides, the question arises whether this is not a case of instability in the locus. We were speaking at some length and were somewhat prolix in order to make the present work accessible to unbiased criticism and to let others find possible errors which we probably are not aware of.

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Seasonal fluctuations of *D. cestri* and *D. incompta,* two species of the *flavopilosa* group.

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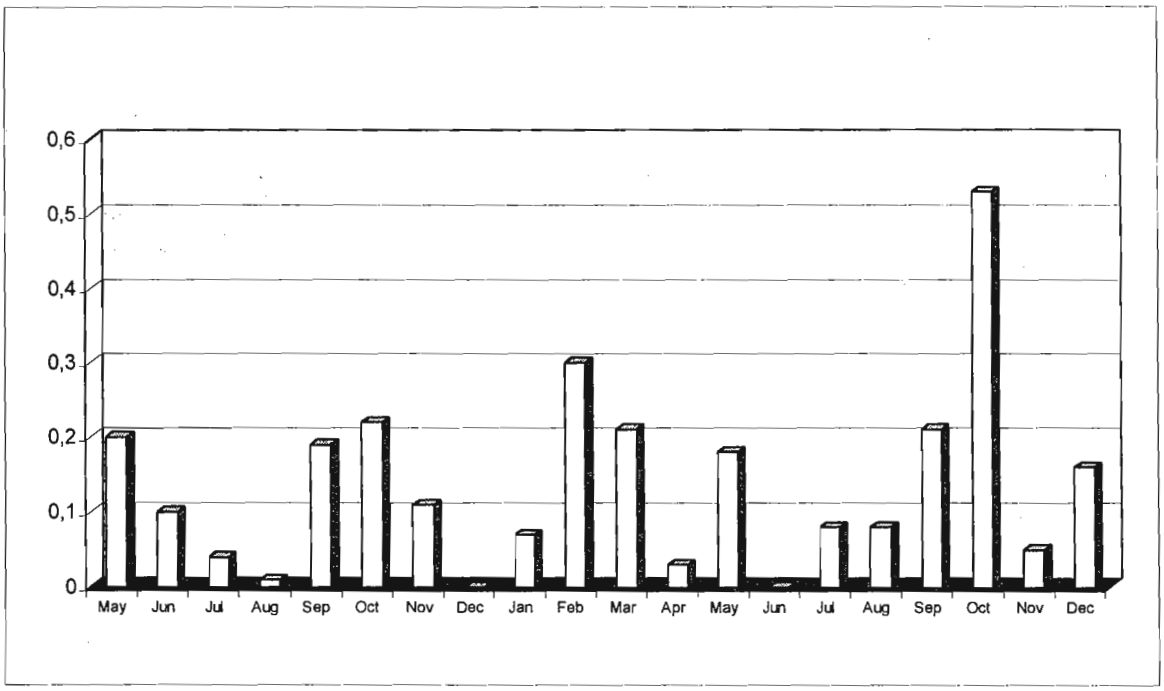
The species of *flavopilosa* group (subgenus *Drosophila*) utilize flowers as exclusive source for feeding and breeding. This group was established by Wheeler *et al.* (1962) to include *D. flavopilosa* and thirteen new species from the neotropical region. Three other species *D. cestri, D. cordeiroi,* and *D. mariaehelenae* were added to the list (Brncic, 1978; Vilela, 1984). They are small to medium size flies and are mostly pale yellow in color. This body coloration is cryptic with respect to the flowers of *Cestrum* (Solanaceae), which in South America constitute the exclusive sites where the adults were seen fluttering, feeding, and ovipositing, and where larvae were seen growing and pupating.

Brncic (1983) has pointed that among flower breeding drosophilids there are cases in which only one species uses a specific flower source. For example in *Drosophila flavopilosa* and some *Zygothrica* species from Colombia, only a single preadult develops inside the flowers of their respective plant-host *Cestrum parqui* and *Salvia rubescens.* In some other species, as *Zaphriothrica dispar* that use large *Datura* flowers, hundreds of individuals have been found inside of a single flower. Brncic (1983) also reported that there are cases that more that one species could live in the

Figure 1 (next page). Seasonal fluctuations in drosophilids/flowers ratio (an estimative of occupation of the oviposition sites). A) Jardim Botânico location. The amount of collected flowers was 44229 in which 7353 drosophilids and 213 wasp parasites emerged. Obs: *Cestrum* flowers were collected weekly but the data were grouped by month. B) Estação Experimental de Silvicultura location. The collected flowers were 27660 and 5048 drosophilids emerged.

Figure 2 (following page). Seasonal fluctuation in *Drosophila cestri* and *D. incompta* frequencies. A) Jardim Botânico; B) Estação experimental de Silvicultura.

A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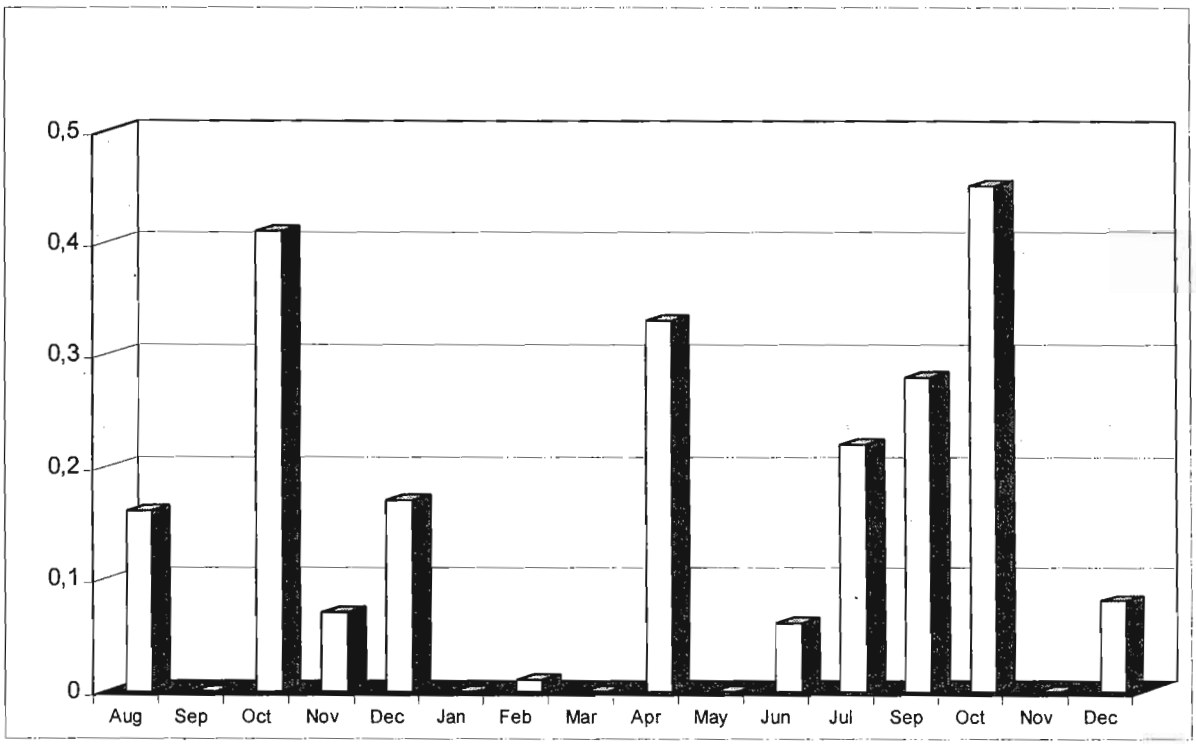
May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

B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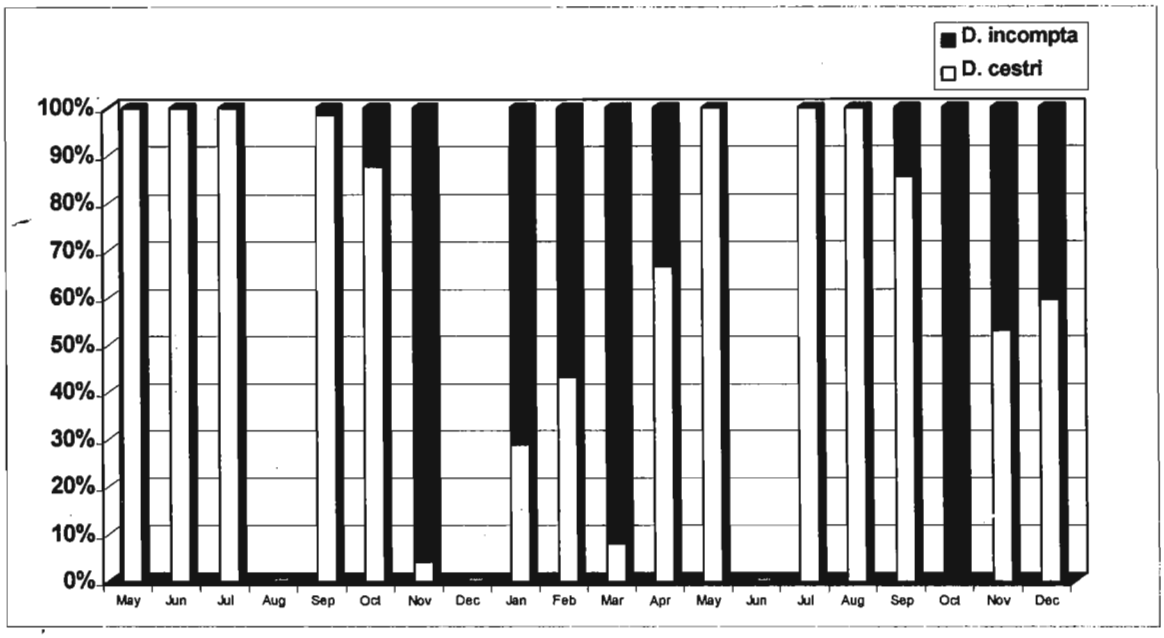
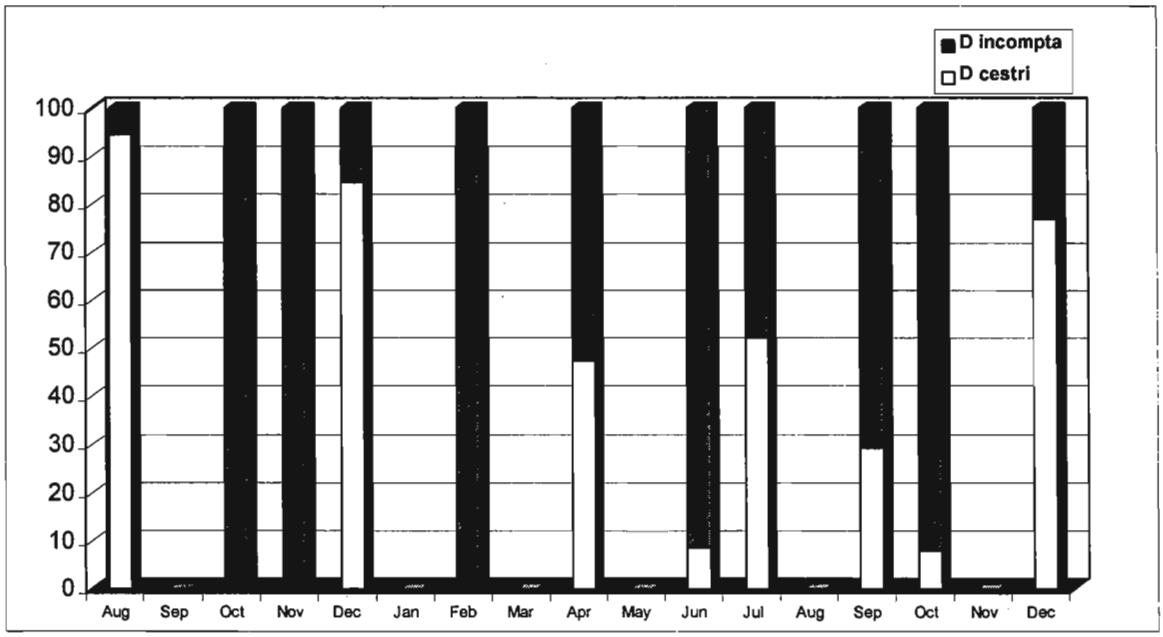
Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Sep Oct Nov Dec

Figure 1

A


D. incompta
D. cestri
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

B


D incompta
D cestri
100
90
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30
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Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

Figure 2

same flowers. For example, in Southern Brazil, *D. cestri* and *D. incompta* preadults have been found together in the flowers of *Cestrum calycinum* and *C. corymbosum* (Brncic, 1978; Napp and Brncic, 1978; Sepel, 1992). Vilela (1984) and Sepel (1992) have shown a third drosophilid species, *Zygothrica vittimaculosa,* also breeding together with those species.

Species that coexist in the same flowers theoretically could be in competitive interactions. The coexistence of *D. cestri* and *D. incompta* in the same breeding and feeding places seems to depend on certain behavioral and ecological differences (Brncic, 1978). *D. cestri* females lay the eggs inside the unopened flowers though minute holes made with their spined ovipositor. Generally only one egg is deposited per flower. The female of *D. incompta* behave differently. They superficially scarify the walls of the opened flowers, specially on the inner parts of the petals, and attach the eggs there. After hatching, the small larvae penetrate into the corolla. The number of the eggs deposited can be as many as twelve in one flower. The *Cestrum* flowers grow in bouquets and touch each other, so the larvae of *D. incompta* could move from one flower to another. Despite of these ecological differences, the existence of these closely related species that utilize resources that are not spatially or temporally separate would be susceptible to competitive stresses of various kinds (Brncic, 1983).

The present note describes the fluctuations in the frequencies of *D. cestri* and *D. incompta* and provides other data on the ecology of the species of the *flavopilosa* group from Rio Grande do Sul, Brazil.

Cestrum calycinum flowers were collected weekly from May 1985 to December 1986 at Jardim Botânico in Porto Alegre, South Brazil (-29°S; 51.5°W) and also monthly from August 1998 to December 1999 at Estação Experimental de Silvicultura, Santa Maria, South Brazil (-29° 41' S, 53°48'W). The flowers were brought to the laboratory, counted, and allowed the *Drosophila* larvae to develop under laboratory conditions until the adults emerged.

Regarding the availability of oviposition sites, it was observed that the species of *Cestrum* have long-term and mainly, non-synchronized flowering. For sites with a large number of these plants, this provides a continuous presence of flowers for oviposition of *flavopilosa* group species.

The number of drosophilids obtained regarding the number of flowers collected was used for evaluating the effective occupation of the oviposition sites. These sites never showed total utilization (100% occupation). As can be seen in Figure 1, a considerable variation was recorded in the effective occupation of the ovipositon sites in both localities. On average only 20% of flowers were occuped. The greater percentage of occupation sites at Jardim Botânico was in October 1986 (53%) and at Estação Experimental de Silvicultura were October 1998 (40%) and October 1999 (43%). The occupation of the oviposition sites evaluated can be an underestimation if there should occur larval and pupal mortality. However, it provides a good estimate of the seasonal fluctuations of the population size.

The periodic collections carried out indicated that the species of the *flavopilosa* group showed seasonal population fluctuations, as we can see in Figure 2. *Drosophila cestri* was the commonest species in the colder and wetter months, whereas *D. incompta* was more frequent in hot and dry periods.

The search for alternative oviposition sites, *i.e.*, flowers from others genera was not successful. Flowers of the following genera were collected: *Aphelandra, Calathea, Solanum, Heliconia, Brunsfelsia, Datura* and *Petunia.* However, the species of the *flavopilosa* group were associated only with *Cestrum* flowers.

It was verified, together with species of the *flavopilosa* group in all collecting sites, the occurrence of *Zygothrica vittimaculosa.* The low relative frequency of this species on *Cestrum* flowers, and the relatively high frequency in *Brunsfelsia* flowers, enhances the hypothesis that this species usees *Cestrum* as a secundary resource.

The competitions among the species ovipositing on *Cestrum* flowers apparently do not have a main importance for the control of the population of these drosophilids. This conclusion is supported by two evidences: the low effective occupation of the ovipotion sites, and the occurrence of seasonal population fluctuations providing an alternation between *D. cestri* and *D. incompta* as dominant species.

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Sepel, L.M.N., 1992, Genética ecológica e relações evolutivas em espécies do grupo *flavopilosa* de *Drosophila.* Master thesis, Univ. F. do Rio Grande do Sul, Porto Alegre, Brazil; Vilela, C.R., 1984, Revta bras. Zool. 2:63-69; Wheeler, M.R., M. Takada, and D. Brncic 1962, Univ. Texas Pub. 6205: 395-413.

Species and numbers of flies collected in the residue deposit area of an orange juice factory.

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Figure 1 shows the Bascitrus Agro-Indústria S/A area in the Mirassol municipality with the sites where the flies were collected. The trucks receive discarded organic matter (trash) (site 1) and take it to the field, where it will be used as organic manure (site 4). Another part of the "trash" is transported and deposited in canals inside a eucalyptus plantation (site 5). Fly collection was performed rapidly, less than three minutes at each site. Among the flies (2325) captured (Table 1), *Chrysomya putorica, Copromyza* sp., *Hippelates* sp., *Musca domestica, Palaeocepsis scabra* and *Stomoxys calcitrans*, normally grow in lees. *Atherigona orientalis* and *Anastrepha* sp. are found in orchards and/or in fruit plantations, in agreement with the presence of a small orchard and a pig breeding house at site 2. Flies of the genus *Copromyza* were common in landfills (site 3). The results showed the conspicuous presence of *D. melanogaster* and *D. hydei* at some sites, such as a

Table 1. Percentage of flies collected at residue deposit sites.

species	site 1	site 2	site 3	site 4	site 5	site 6	site 7	site 8
Atherigona orientalis	79	39			3		3	
Anastrepha sp.		1						
Copromyza sp.		1	65					
Chrysomya putorica		1						
Drosophila hydei	5	12	3	88	31	89	30	3
D. latifasciaeformis		1						
D. melanogaster	4	28	18	12	64	11	64	97
Fannia pusio	4	1	14		1		1	
Hippelates sp.	4	9						
Musca domestica	4	5			1		1	
Omidia obessa		1						
Palaeosepsis scabra							1	
Stomoxys calcitrans		1						
Total	74	317	97	258	578	271	591	139