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A NEWLY INTRODUCED DROSOPHILA SPECIES IN BRAZIL (DIPTERA, DROSOPHILIDAE)

F. C. VAL¹
F. M. SENE²

ABSTRACT

D. malerkotliana, previously known from India, Borneo, the Philippines, Thailand, Malaya and Africa, is now reported from several localities in Brazil.

In 1976, Sene collected in northeastern Brazil, a large number of flies of a species of the *melanogaster* group which we were not able to identify (Sene & Val, 1977). Earlier collectors had not reported this species from Brazil or elsewhere in the Neotropics (Dobzhansky & Pavan, 1950 and Wheeler, 1970). The possibility that the species could have been misidentified in the past was rejected when investigators most familiar with South American *Drosophila* were asked to examine specimens of this species. Drs. C. Pavan, A. B. da Cunha, L. E. Magalhães, D. R. Cordeiro, H. L. Carson, and D. Brncic all confirmed that this species was not present in their collections during the 1940's, 1950's and early 1960's. We were not able to verify this observation since most of the specimens collected by earlier collectors were not preserved in museum collections.

Samples of this species were sent to Drs. M. R. Wheeler (Austin, Texas) and K. Y. Kaneshiro (Honolulu, Hawaii) and subsequently to Drs. L. Tsacas (Paris, France) and I. Bock (Melbourne, Australia). Tsacas was the first to identify the species as *Drosophila (Sophophora) malerkotliana* Parshad & Paika. Kaneshiro, after comparing genitalia preparations of our species with those in his collection, indicated that it was close to *malerkotliana* although he observed a few minor differences in the male genitalia as well as in the the ovipositor blades of the female. Bock confirmed that our species appeared to be *malerkotliana* although the number of bristles in the sex-comb was slightly higher than what he usually finds in this species. Subsequently, Tsacas (pers. comm.) confirmed the identification of the species as *malerkotliana* when he obtained abundant offspring for several generations from crosses between his African strains of *malerkotliana* and strains which we sent to him.

Our own observations of the male sex-comb and genitalia of the Brazilian specimens (Fig. 1) when compared to the illustrations of these characters in related species (Bock, 1971, 1972 and 1978) agree with those of Kaneshiro, Bock, and Tsacas. We were not able to duplicate the crossing experiments performed by Tsacas since the live material which he sent to us was hopelessly delayed in the mails and did not survive.

Drosophila (Sophophora) malerkotliana Parshad and Paika 1964, is a member of the *bipunctinata* species complex (*ananassae* subgroup of the *melanogaster* species group). According to Bock and Wheeler (1972) *malerkotliana*, originally described from India, is also known to occur in Borneo, the Philippines,

¹ Museu de Zoologia, Universidade de São Paulo.

² Departamento de Biologia, Univers. de São Paulo, C. P. 11.461, 01000 São Paulo.



Fig. 1. *D. malerkotliana* - a-b - male genitalia; c - sexcombs of two specimens from Serra do Cipó, MG.

Thailand and Malaya. Bock (1971) recognizes two subspecies of *malerkotliana* on the basis of male abdominal pigmentation. The nominal subspecies, from mainland Asia, has the distal portion of the male abdomen shiny black; the subspecies *pallens* (Bock and Wheeler 1972), from Borneo and the Philippines, has the entire male abdomen pale brown. Kaneshiro and Wheeler (1970) observed a difference in karyotypes between these two subspecies; the Y chromosome is J-shaped in *D.m. pallens* (sp. 10) and V-shaped in *D.m. malerkotliana* (sp. 11).

Tsacas (1971) and Lachaise (1974a, 1974b, 1975, 1976) reported *malerkotliana* as occurring in several countries of Africa. Although Tsacas (1971) found differences in the shape of the Y chromosome, which is rod-shaped in the African (Nigerian) strains, he (pers. comm.) confirmed their identity as *malerkotliana* when he crossed them to Asian strains. Tsacas (1971) also reported slight differences in the color pattern of the abdomen and described the first abdominal tergite of the male as yellow, the 2nd, 3rd, and 4th as brownish posteriorly, and the remaining two segments as shiny dark brown, sometimes black.

The abdominal color patterns of the Brazilian populations agree well with Tsacas' description of the African strain. However, the shape of the Y chromosome of our strains (J-shaped) is like that described for the subspecies *pallens*.

In Table 1 we present the percentage of *malerkotliana* and total number of *Drosophila* collected in several localities (these will be described elsewhere: Sene, Val, Vilela, and Pereira, in press). Localities were grouped according to the type of vegetation. Figure 2 is a map showing the localities listed in Table 1. All specimens collected are deposited in the Museu de Zoologia da Universidade de São Paulo.

DISCUSSION

Despite the minor morphological differences between the Brazilian and the Asian strains, Tsacas crossing experiments have led us to believe that the Brazilian species is conspecific with *malerkotliana*. However, Bock (1978) reports that interspecific hybridization is possible in the laboratory among several combinations of the *bipectinata* complex of species; it is thus desirable that further hybridization tests be made to confirm the present identification.

Because of the fact that *malerkotliana* was not recorded in the extensive collections of earlier *Drosophila* investigators in Brazil, we believe that this species is a recently introduced fly. The high percentage of *malerkotliana* in some localities and the large area already colonized by this species, indicate its success in the new environment. So far, it has not been found in some localities inside the Atlantic forest, in some others in the Pantanal of Mato Grosso and south of the state of Santa Catarina. Its geographical distribution in open types of vegetation (caatingas, cerrados, dunes, and grasslands) is similar to the pattern observed for other introduced species. *D. malerkotliana* was also collected in special kinds of forests: gallery forests, enclaves of forests within the caatingas domain, and in the "restingas" (strand vegetation). In the State of Paraná, on the Rio Ivaí, it has been collected in a large area of high forest but never far from the river bank, which is a disturbed environment.

D. Malerkotliana has also been collected associated with garbage in the city of São Paulo, in a park near the Museu de Zoologia. Besides having been collected on baits of fermented bananas and oranges, it has been bred from a small native palm nut, *Arecastrum romanzoffianum* (Chamisso), and a native cactus, *Cereus pernambucensis* Lemaire. As a recently introduced species, *malerkotliana* is probably competing with other species of our endemic and

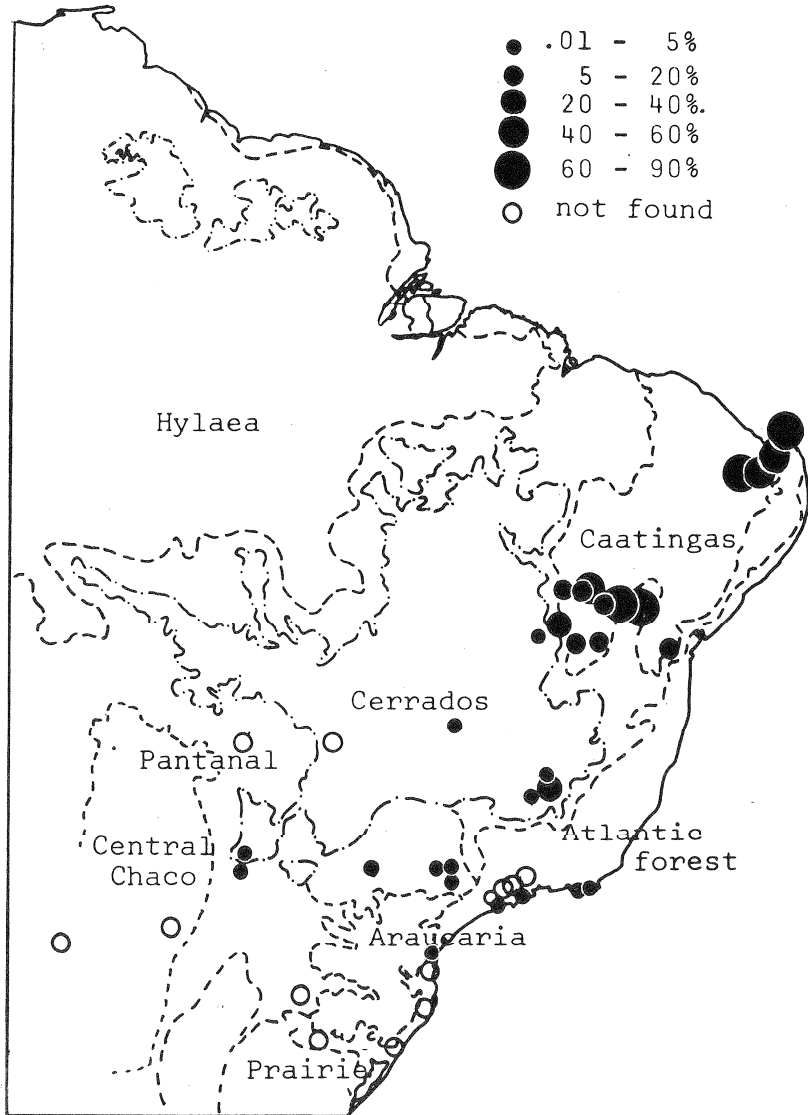


Fig. 2. Map of the distribution of *D. malkotiana* in recent collections in Brazil. The size of the black dots indicate the percentage of *D. malkotiana* collected. The white dots indicate localities where this species was not found.

Table 1. List of localities with total number of *Drosophila* collected and the percentage of *D. malerkotliana* in the samples

	Localities	% of <i>D. malerkotliana</i>	Total nº of <i>Drosophila</i> specimens
Forests	Rio Ivaí, PR, on the river bank	0.01	19,502
	Rio Cipó, MG; gallery forest	26.90	3,318
	Piritiba, BA, enclave	75.6	7,513
	Peruíbe, SP, on beach ridge	0.7	148
	Guaratuba, SP, on beach ridge	0.4	2,282
	Pirabeiraba, SC, forest close to houses	0.003	7,650
Cerrados	Brasília, GO	0.5	782
	Barreiras, BA	5.0	4,819
	Lagoa Santa, MG	1.0	309
	Itu, SP	0.9	338
	Caracol, MT	0.4	1,938
	São Carlos, SP	2.3	1,939
Mogi Guaçu, SP	0.3	3,355	
Caatingas	Irecê, BA	7.5	384
	Bom Jesus, RN	55.8	389
	Junco do Seridó, PB	52.7	2,053
	S. José de Espinhares, PB	81.8	1,844
	Milagres, BA	13.4	1,682
	Cachoeira dos Monteiros, BA	5.2	687
	Ibotirama, BA	8.6	243
	Barreiras, BA	26.4	451
	Mira-Serra, BA	78.0	1,266
	Cafarnaum, BA	51.8	4,452
Xique-Xique, BA	19.1	508	
	Bela Vista, MT, transition	1.0	5,418
Littoral	Barra do Maxaranguape, RN	65.4	1,807
	Arraial do Cabo, RJ	0.7	1,644
	Cabo Frio, RJ	4.7	85
	Peruíbe, SP	1.5	522
	Guaratuba, SP	0.9	1,046
Rocky Meadows	Serra do Cipo, MG	0.3	289
	Morro do Chapéu, BA	13.6	368

native fauna and this may result in a different composition of the drosophilid fauna in the future.

The introduction of an exotic species in Brazil is not an uncommon event. At about the same time that *malerkotliana* was first collected, our colleagues at the Museum registered three species of Old World blowflies of the family Calliphoridae occurring in the city of São Paulo and other localities in southern Brazil (Guimarães et al., 1978). Recently, the invasion of an African beetle, *Lagria villosa* Fabricius, was reported from many localities in Brazil (Spilman 1978).

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