

DERMATOZOONOSIS BY *CULICOIDES*' BITE
(DIPTERA, CERATOPOGONIDAE) IN SALVADOR,
STATE OF BAHIA, BRASIL.

III — *Epidemiological Aspects* *

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(With 2 text-figures)

There are many references in literature, to dermatosis due to insects bite, and even dermatosis by *Culicoides*' bite has been studied although less extensively.

It is difficult, sometimes, to establish the ethiology of Dermatozoonosis by *Culicoides*, chiefly because of the small size of the dipterus, which is not always seen during the bite. However, though the density of several hematophagous insects is high in Salvador, the information given by patients, and the epidemiological evidences presented below, seem to indicate that *Culicoides* are responsible for the majority of Dermatozoonosis which is now afflicting the people of Salvador.

METHODS

The records of patients with Dermatozoonosis seen in the Dermatological Clinic of the "Hospital das Clínicas da Universidade da Bahia", from 1958 to 1961 were examined. One hundred and eighty out of 244 records of individual patients, provided information concerning places of residency, age, sex and color, for the present study.

On the other hand, in a house to house survey, the following questionnaire was submitted to people living in the districts where

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Culicoides was a pest, in order to get information on the ways in which the “maruim” molested the population:

- Address:
- How long have you lived in the district?
- Does the “maruim” bother you?
- How long have you been bothered?
- How many people live in your house?
- How many are bothered?
- What time of the year do they become a pest: { winter?
summer?
all year round?
- Have you been using insecticides to fight the “maruim”?
- If so, which one?
- What results do you get from it: { good?
regular?
none?

Six hundred and forty six homes were thus visited in several city districts.

RESULTS AND COMMENTS

Distribution of cases per zone

It is clear for those who are interested in the subject, that the population of anthropophylous insects has inexplicably increased in the city of Salvador. As we have already mentioned in another paper (5), the City, in view of its climatic and geomorphological characteristics, presents ideal environmental conditions for the spreading of insect populations.

As far as the “maruim” is concerned, although it has been reported for many years, it was only found in the poor sanitated areas of the city, particularly in those places where soil conditions (water collections, pools of rainy water, and garbage deposits) offered them possible natural breeding places.

To our great surprize, in eighty one per cent of the five hundred and ninety three homes we visited, in several districts of the city, people complained of being pestered by *Culicoides*, as shown on Table I.

As we pointed out in a previous paper (4), *Culicoides* were found in all districts of the city that were inspected, varying in density from one district to another. The greatest number of Dermatozoonosis cases, as we can see in Table II, comes from the districts of Brotas, Federação, Garcia, Liberdade, and Rio Vermelho, where the density of *Culicoides* is generally high.

TABLE I

Number of homes being annoyed by *Culicoides* in several districts of Salvador, according to information obtained from 593 surveyed homes

DISTRICTS	N.º of homes questioned	N.º of homes molested	Percentage of homes molested
Amaralina.....	35	35	100
Barra.....	75	57	76
Brotas.....	86	75	87
Canela.....	37	37	100
Federação.....	78	78	100
Garcia.....	50	40	80
Graça.....	50	36	72
L. do Tanque.....	49	20	41
Vitória.....	34	32	94
Rio Vermelho.....	50	50	100
Liberdade.....	49	20	40
TOTAL.....	593	480	81

TABLE II

Distribution of 211 cases of *Dermatozoonosis* by Districts, in Salvador

DISTRICTS	Number of cases	DISTRICTS	Number of cases
Barbalho.....	5	Matatu.....	4
Barra.....	4	Mont Serrat.....	1
Barra Avenida.....	3	Nazaré.....	7
Barris.....	3	Pau Miudo.....	7
Bonfim.....	1	Pojuca.....	1
Brotas.....	26	Quintas.....	13
Cabula.....	6	Retiro.....	1
Calçada.....	4	Rio Vermelho.....	20
Canela.....	5	São Pedro.....	4
Federação.....	22	Saúde.....	1
Garcia.....	23	Sé.....	2
Itapagipe.....	4	Tororó.....	3
L. do Tanque.....	6	Uruguai.....	1
Liberdade.....	12	Vitória.....	3
Lobato.....	1	Unknown.....	17
TOTAL NUMBER OF CASES.....	211		

Age incidence of Dermatozoonosis

On studying urticaria caused by insect bite, Shaffer et al (1952) call the attention to the fact that it is more common among children, chiefly between the age of two and seven. They concluded that children are more affected because they are exposed to higher degree to insect bites.

The study of 211 Dermatozoonosis cases showed only a slightly higher rate among individuals from 11 to 20 years old, as it can be seen in the following data:

Age	N. ^o of patients
0 — 5	23
6 — 10	15
11 — 15	35
16 — 20	34
21 — 25	22
26 — 30	14
31 — 35	21
36 — 40	13
41 — 45	5
46 — 50	8
51 — 55	3
56 — 60	7
More than 60	1
Unknow	10
TOTAL	211

Possibly the lower number of cases among the age group from 50 to more than 60, is in close relation to the lower percentage of inhabitants of this age level in the total population. On the other hand, perhaps the style of clothing used by the people of that age group protects them better against *Culicoides*' bite.

Race incidence of Dermatozoonosis

The observation of two hundred and eleven Dermatozoonosis cases shows that there is a greater incidence among the negroes, as we can see in the following data:

Color	Number of patients
White	39
Mulatto	49
Black	123
TOTAL	211

Among the patients treated in the Hospital das Clinicas it seems that there is a greater number of negroes, and this fact probably explains the higher incidence of cases among those individuals.

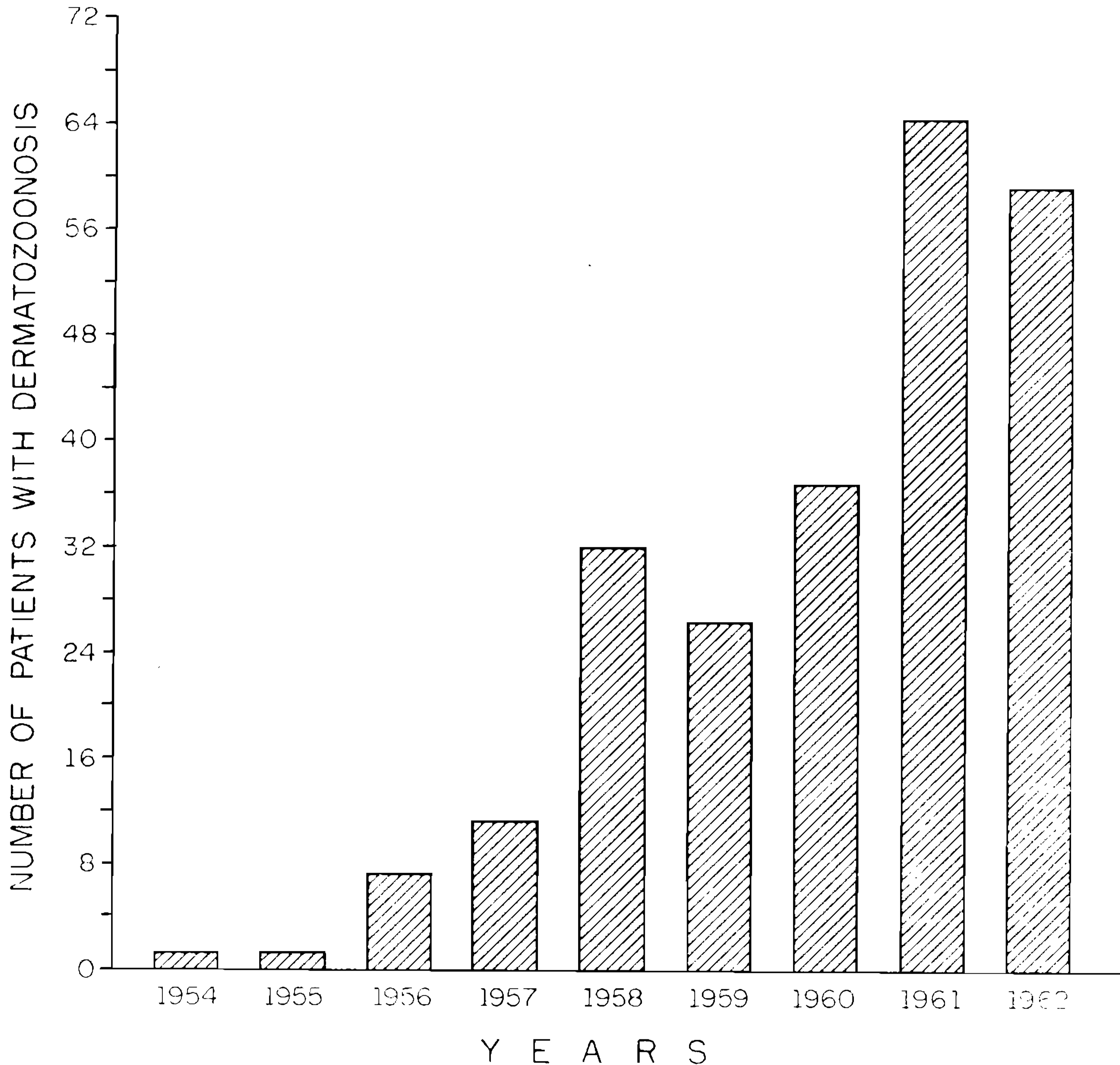


Fig. 1

Fig. 1 — Yearly incidence of Dermatozoonosis cases in the "Hospital das Clinicas da Universidade da Bahia".

Sex incidence of Dermatozoonosis

The data given below show that the lesions have greater incidence in the female sex. Because women's fashions leave their legs more exposed, it is possibly easier for *Culicoides* to bite them.

Many persons told us that men, even wearing shorts, are not so much bitten by *Culicoides*. These information do not seem true, since our collectors who are of the male sex, report that *Culicoides* bit their legs when they used them as baits. Unfortunately we did not make

observations by which we could compare the biting incidence on men and women. The data on the sex incidence of the Dermatozoonosis are the following:

Sex	Number of patients
Male	11
Female	200
TOTAL	211

Yearly incidence of Dermatozoonosis

From 1954 on, there has been an increasing number of patients suffering from Dermatozoonosis (See Figure 1). Closely related to this fact, the complaints against "maruim" pest are more recent too, since the density of *Culicoides* has also increased in the last five years.

The majority of persons living for more than five years, in the site of inquiry, reports that the *Culicoides* annoyance goes back two or three years ago (Table III).

TABLE III

Time period of annoyance by *Culicoides* according to information obtained from 156 homes of people living for more than five years in several districts of Salvador

TIME PERIOD OF ANNOYANCE (years ago)	N.º of homes molested	Percentage of homes molested
Less than one year.....	9	6
For one year.....	15	10
For two years.....	62	40
For three years.....	32	20
For four years.....	13	8
For five years.....	14	10
For more than five years.....	11	7
TOTAL.....	156	100

Monthly incidence of Dermatozoonosis

One of the factors that first called our attention to the role of *Culicoides* in Dermatozoonosis was the coincidence of having more patients come to the Hospital to treat Dermatozoonosis, whenever the density of *Culicoides* in the city was higher.

Figure 2 shows that the number of patients, who came to the Hospital in different months during the years from 1959 to 1962, reaches a maximum from May to August. Accordingly, the monthly rate of *Culicoides* parallelly increased during this period of time.

A close analysis of Table IV reveals that the majority of persons (sixty per cent) complains that the rainy season is the time of greatest annoyance. These data coincide with the ones we got concerning the monthly density of *C. paraensis* in the city and with the monthly admission rate of patients to the Hospital. We have already remarked that *C. paraensis* can be found all year round, having, however, highest density during the rainy months or shortly after them, in the time of the year locally called "winter".

TABLE IV

Period of greatest pest of Culicoides, according to informations obtained from 551 homes questioned in several districts of Salvador

DISTRICTS	N.º of homes questioned	PERIOD OF GREATEST PEST, AND NUMBER OF HOMES MOLESTED			
		Winter	Summer	All year round	Total
Amaralina.....	35	34	1	0	35
Barra.....	75	54	0	0	54
Brotas.....	86	68	11	2	81
Federação.....	78	70	0	8	78
Garcia.....	50	35	3	2	40
L. do Tanque.....	7	7	0	0	7
Liberdade.....	49	20	3	3	26
Rio Vermelho.....	50	26	18	6	50
Vitória.....	34	21	7	3	31
TOTAL.....	501	368	47	24	439
PERCENTAGE...		73	9	5	100

Hours of greatest pest

As we pointed out in a previous paper (5), the hourly activity of *C. paraensis* reaches three different peaks: between, six and seven o'clock in the morning, two and three o'clock in the afternoon, and four and five o'clock in the evening. From the information we got, we concluded that the hours of greatest pest are the ones we observed before, as being the time of higher incidence of *C. paraensis*. This can be checked by looking at Table V. It is fair to say, however, that although the highest density of *Culicoides* is recorded between six and seven o'clock in the morning, the complaints do not refer mainly to those hours. It is easy to understand that at such early hours people are still more protected from *Culicoides*.

TABLE V

Hours of greatest pest of *Culicoides*, according to information obtained from 646 homes in several districts of Salvador

DISTRICTS	PERIOD OF ANNOYANCE AND NUMBER OF HOMES MOLESTED				
	Morning	Afternoon	Evening	Night	Total
Amaralina.....	0	12	23	0	35
Barra.....	19	40	46	0	105
Brotas.....	20	54	52	1	127
Canela.....	9	16	35	1	61
Federação.....	10	40	27	1	78
Garcia.....	5	4	27	1	37
Graça.....	13	37	0	0	50
L. do Tanque.....	0	2	5	0	7
Liberdade.....	12	19	0	0	31
Rio Vermelho.....	40	4	6	0	50
Vitória.....	14	27	15	9	65
TOTAL.....	142	255	236	13	646
PERCENTAGE...	22	39	36	2	100

Comments on the present density of Culicoides in Salvador

The number of Dermatozoonosis cases has been increasing in the last few years in Salvador parallelly with the density of anthropophilous insects. The complaints against "maruim" is also quite recent, since the majority of persons informed that it started just three years ago. For these reasons, it is not difficult to assert that the great majority of Dermatozoonosis cases are being caused by *Culicoides*.

A possible explanation for the present density of *Culicoides* in Salvador is as follow. Until 1956, when the "Serviço Nacional Contra a Febre Amarela" was still in existence, it indirectly helped eliminate the *Culicoides*, by means of their campaign against the *Aedes aegypti* (Lin). This service obliged people to destroy garbage deposits or any container

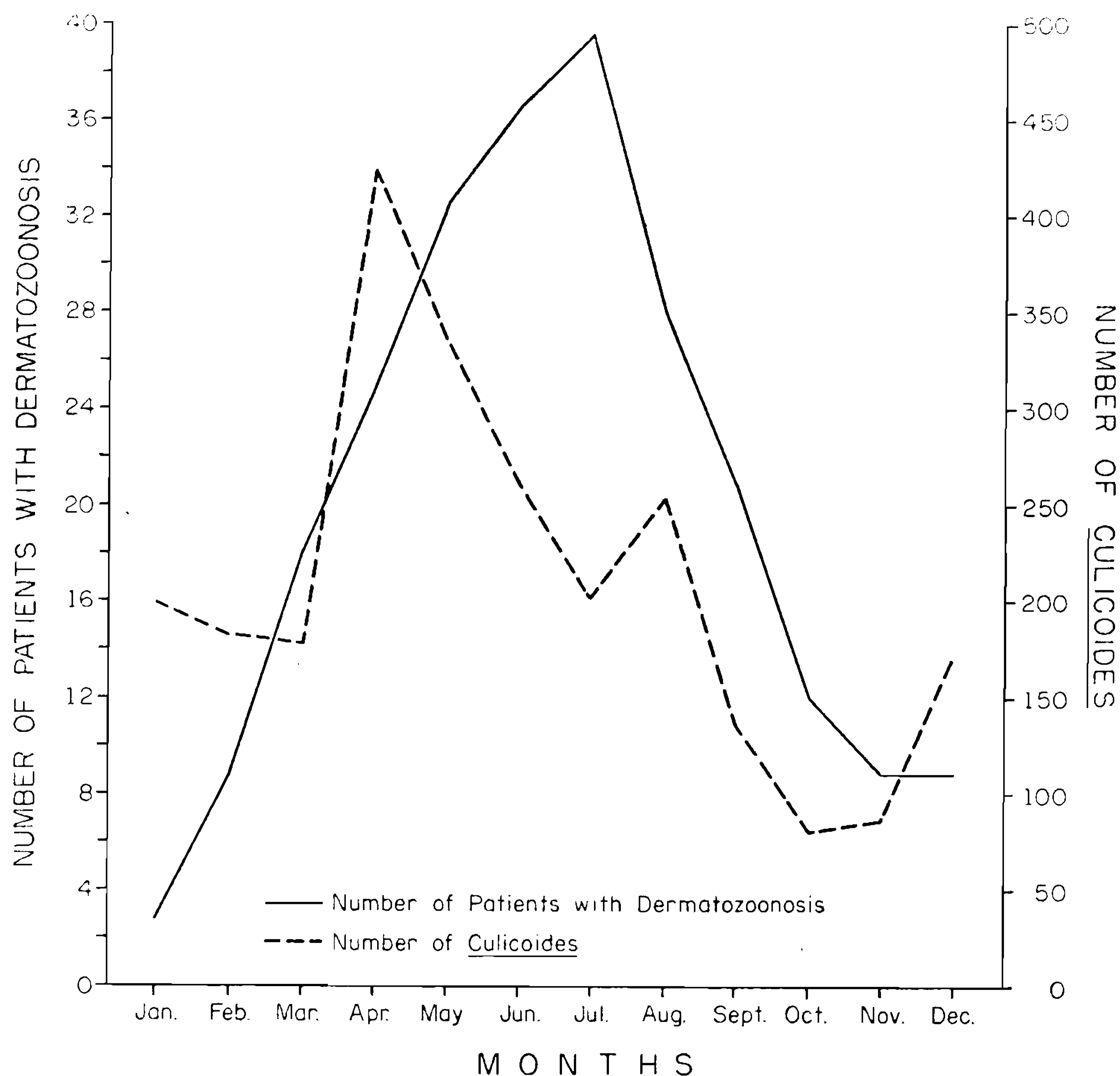


Fig. 2

Fig. 2 — Monthly incidence of Dermatozoonosis cases in the "Hospital das Clínicas da Universidade da Bahia", during the years from 1959 to 1962, and monthly incidence of *Culicoides* in Salvador, during the same period.

left on backyards or vacant lots, and urged residents to keep such places in good sanitary conditions.

Shortly after the activity of the "Serviço Nacional Contra a Febre Amarela" was discontinued, the City Department of Sanitation suffered a collapse, and as result garbage started being accumulated on yards, vacant lots and even in public squares. Furthermore, the City grew very fast and consequently the number of open ditches increased markedly, particularly in the fringe areas, where there is practically no sewage system. All this contributed to the appearance of a large net of "potential sources" for the raising of *Culicoides*.

It is possible that those measures against mosquitoes which were mentioned above, also avoided the proloferation of *Culicoides* and its spreading throughout the city, since, as we remarked in a previous paper (5), the natural breeding places of *C. paraensis* are probably water collected in dumps, tree holes, vessels left on vacant lots or in ditches. Questioning people about the ways in which they fight the "maruim", only in one hundred and five out 551 surveyed homes, did people use any chemical substance against the *Culicoides*. Among those homes, insecticides were used only in fifty seven, whereas repellent substances were employed in ten, and various substances such as kerosen, gasoline and desinfectants, were used in the remaining 21 homes. Data on Table VI suggest that such are inadequate measures to fight the diptera, since fifty six per cent of them did not get any results, and only nineteen per cent of good results were observed.

TABLE VI

Substances used against *Culicoides*, in 74 out of 551 homes in several districts of Salvador

TYPE OF SUBSTANCES USED	RESULTS, AND NUMBER OF HOMES THAT FIGHT MARUIM							
	Good		Regular		None		Total	
	N.º	%	N.º	%	N.º	%	N.º	%
Insecticides (+).....	9	16.0	14	24.5	34	60.0	57	100
Repellent substances (++).....	3	30.0	3	30.0	4	40.0	10	100
Other substances (+++).....	8	21.0	9	24.0	21	55.0	38	100
TOTAL.....	20	19.0	26	25.0	59	56.0	105	100

- + Neocid, Detefon, Flit (Comercial substances taking as basis DD).
- ++ Rhodiasol, Repelex (Commercial products of Roche Laboratory).
- +++ Desinfectant, Kerosen, Burnt powder, etc.

There may be other ways to explain the present high density of *Culicoides* in Salvador. We believe, however, that our hypothesis is the most adequate to explain this "pest" that now is spreading throughout all districts of the City.

SUMÁRIO

Nesta terceira contribuição os Autores apresentam os aspectos Epidemiológicos da Dermatozoonose pela picada de *Culicoides* em Salvador. Salientam que embora a densidade de insetos outros de hábitos antropófilos seja elevada na cidade, as seguintes evidências os conduziram a responsabilizar os *Culicoides*: coincidência do aparecimento de casos de Dermatozoonose após um período de maior densidade de *Culicoides*; maior número de casos, desde que a densidade de *Culicoides* aumentou nos últimos anos; proveniência de maior número de casos dos bairros onde há maior infestação de *Culicoides*.

A Dermatozoonose é acentuadamente mais freqüente no sexo feminino. Houve maior número de casos entre os negros, talvez devido a maior freqüência de negros que procuram tratamento no Hospital das Clínicas. Não há predominância acentuada para determinado grupo etário.

Num levantamento que fizeram sobre a incomodidade do *Culicoides* observaram que 81% de 593 residências visitadas em diferentes bairros, são incomodadas, sendo o inverno a época de maior incômodo. As horas de maior incômodo, coincidem com a ocorrência horária máxima do *Culicoides*.

Observaram que as medidas usadas pela população para combate ao inseto são inadequadas pois, em 56% das residências não se obtém qualquer resultado.

Considerando que nesses últimos cinco anos a densidade de *Culicoides* aumentou inexplicavelmente em Salvador, julgam que os seguintes fatores participaram para que esse fenômeno ocorresse: a extinção do Serviço de Profilaxia da Febre Amarela em 1956, o qual, indiretamente, por meio de sua "polícia de focos" combatendo o *Aedes aegypti*, controlava os *Culicoides*; o crescimento da cidade, aumentando o número de fossas, já que não existe um sistema de esgotos adequado; e a deficiência do Serviço de Limpeza Pública da Cidade, ocasionando o acúmulo de lixo nos quintais, terrenos baldios e mesmo em logradouros públicos.

Essas condições permitiram a existência de uma extensa rede de "focos potenciais" para a proliferação dos *Culicoides* que agora infestam a cidade.

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