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PARASITES OF THE HOUSE FLY *MUSCA DOMESTICA* L. (DIPTERA, MUSCIDAE) IN IRAQ.

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ABSTRACT

Eleven species of parasitic insects were recovered from puparia of house fly *Musca domestica* L. developing in animal dung in Baghdad during 1985 - 1987. Of the parasites obtained, representatives were found in five families of Hymenoptera and one family of Coleoptera. The most prevalent parasites were *Spalangia cameroni* Perkins, *S. nigroaenea* Curtis and *S. endius* Walk.

Average parasitism for the two year was 11.30 %, the highest number of parasitism occurred in May and October.

INTRODUCTION

The common house fly *Musca domestica* L. (Diptera, Muscidae) is a true synanthropic fly, being widely distributed all over the world, and responsible for transmitting number of diseases to man and animals.

Great efforts have been made to control house fly using insecticide, but it has proved very difficult to control because it rapidly becomes resistant to almost every type of insecticide (Newmann, 1965)

While house fly seems to be always attacked by a parasite, however, a survey of its parasites was carried out throughout the world since the beginning of this century (Legner, 1966 ; Legner and Bnydon, 1966) in order to find biological control agents. A total of 60 species of parasitic insects mainly in the order Hymenoptera have been reported by Fabritius (1983) as destroying the puparia of house fly in various parts of the world. The pteromalids were the most important group of parasitic Hymenoptera, particularly the species of the genus *Spalangia* which have been reported as an effective control agent of the house fly in various parts of the world.

pupae of the house fly , efforts to determine such parasites in Iraq are very few . The only work available was that of Mahmoud *et al* . (1983) , who reported three hymenopterous parasites namely *Spalangia nigroaenea* Curtis , *S . cameroni* perkins and *Dirhinus crythroceras* Cameron (= himalayanus West .) from puparia of house fiy in Mosul , Northern Iraq .

The present study is concerned with determining the native natural parasites of the house fiy in Baghdad and to evaluate the effectiveness of these parasites .

MATERIALS AND METHODS

Dung of various animals, containing house fly pupae, were taken once a week when possible from 25 June 1985 to 18 June 1987 (Fig.1). Puparia were separated from dung by hand-sorting. Each pupa was then placed in gelatin capsules and kept in the laboratory at room temperature . Emergence of the house fly and parasites was checked daily. Once they had emerged, they were killed, mounted and identified. The puparia were held for four weeks, which allowed sufficient time for the house fly and parasites to complete their life cycles and emerge as adults.

Identifications of Staphylinidae were made by Dr. J. Bohac , Institute of Landscape Ecology , Czechoslovak Academy of Sciences; of Ichneumonidae by Dr. K. Horstman. Zoologisches Institut, West Germany; of Pteromalidae, Chalcididae , Cynipidae and Prototropidae by first author and of Muscidae by third author.

RESULTS AND DISCUSSION

A total of 3798 puparia of common house fly *Musca domestica* breeding in animal dung were collected at Baghdad during 1985-1987. Of the puparia collected, 11.30% were parasitized by eleven species of parasitic insects. Nine of the species in five families were Hymenoptera and two in one family were Coleoptera (Table 1).Pteromalidae was the most abundant and widely distributed family.It had the largest number of species (5) represents 81.47% were determined as *Spalangia cameroni* Perkins , 23.15 % as *S. nigroaenea* Curtis , 21.06%as *S. endius* Walk., 6.94% as *Muscidifurax raptor* Girault and Sanders and 1.39% as *Nasonia vitripennis* (Walk .) . The most effective parasites were *S. cameroni* accounted for the destruction of 3.24 % of the fly pupae , *S . nigroaenea* destroyed 2.63 % and *S . endius* destroyed 2.40 % of the fly pupa . These species were found in all localities from which house fly were examined . Staphylinidae constituted second important family represented two species *Aleochara moesta* Grav . and *A. verna* Say . These formed 7.41 % of the total parasites , and accounted for the destruction of 0.84 % of the fly pupa . The least abundant groups were chalcididae , Ichnumonidae , Cynipidae and Diapriidae , which each represented one species and formed for only 10.88 % of the parasites . These four species together accounted for the destruction of 1.27 % of the fly pupae . Table 2 and figs . 2 & 3 showed that the parasitoid *Spalangia endius* ranked third after *S . nigroaenea* and *S . cameroni* in 1985 - 86 and after *S. cameroni* and *S. nigroaenea* in 1986 - 87 . This is in accordance with Rutz and Axtell (1980) who found that percent relative abundance of *S . endius* in three geographical regions of North Carolina was always lower than that of *S . cameroni* and *S . nigroaenea* . Moreover , *S . endius* seems to avoid lower house fly pupal densities in preference for higher

densities (Rutz and Axtell , 1980) , the matter which greatly affected by the two weeks period cleaning of the collection place of this work . This fact may also explain the irregularity of parasitism rate over the period of study which was reflected by absence of clear peaks of population for both the host and parasite . Two factors are playing role in this matter , temperature and habitat stability . The first seems to have a small part since there is almost a relative stability of temperature inside collection place and also there is no clear differences in general temperature rates and relative humidity all over the two years (fig . 4) , while habitat stability participate a great deal in the irregularity of parasitism rates since the parasitoid *Spalangia cameroni S . nigroaenea* , and *S . endius* are capable of a bufferlike action in their abilities to increase their rate of production in response to increasing host densities (Legner *et al* . , 1967) . Also . Mahmoud *et al* . (1983) in their study of house fly parasitoids in Mosul , northern Iraq observed that the peak house fly parasites population conincided with the main breeding period of house fly . Therefore , irregularity of parasitism rates is not surprising .

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Table 1 . parasitic insects reared from *Musca domestica* L. in Baghdad during 1985 - 87

Parasite species	Host stage attacked	Mode of attack	total no.	% of total	% among parasites
Hymenoptera					
Pteromalidae					
Spalangia cameroni Perkins	Pupa	Ectoparasitic	123	3.24	28.47
S. nigroaenea Curtis	=	=	100	2.63	23.15
S. endius Walker	=	=	91	2.40	21.06
Muscidifurax raptor . Gir . and sand..	Pupa	=	30	0.79 .	6.94
Nasonia vitripennis (Walk .)	=	=	6	0.16	1.39
Chalcidiae					
Dirhinus crythroceras Cameron	Pupa	=	31	0.82	7.18
Cynipidae	Larva	Endoparasitic	2	0.05	0.46
Eucoila sp .					
Diapriidae	pupa	Endoparasitic	3	0.08	0.69
Trichopri sp .					
Ichneumonidae	Larva	Endoparasitic	11	0.29	2.55
phygadeuon trichops Thoms .					
Coleoptera					
Staphylinidae	pupa	Ectoparasitic			
	pupa	Ectoparasitic		0.84	
Aleochara moesta Grav			32		7.41
A . verna Say				11.30	
no . of pupae examined 3798			429		

Table 2 . Collection dates , number of house fly pupae collected , number of parasitoids to emerge , and percent of pupae parasitized .

Collection date	No . house fly collected	No . parasites to emerge	% pupae parasitized
June , 1985	72	2	2.78
July	246	9	3.66
Aug .	100	3	3.00
Sept .	129	5	3.88
Oct .	280	58	20.71
Nov .	212	23	10.85
Dec .	90	1	1.11
Jan . , 1986	242	47	19.42
Feb .	152	27	17.76
Mar .	95	6	6.32
April	150	3	2.00
May	190	76	40.00
June	260	25	9.62
July	200	10	5.00
Aug .	100	3	3.00
Sept .	82	9	10.98
Oct .	45	12	26.67
Nov .	145	46	34.07
Dec .	175	6	3.43
Jan . , 1987	120	1	0.83
Feb .	191	13	6.81
Mar .	40	9	22.50
April	157	28	17.83
May	149	4	2.68
June	146	6	4.11
July	-	-	-
Aug .	40	0	0

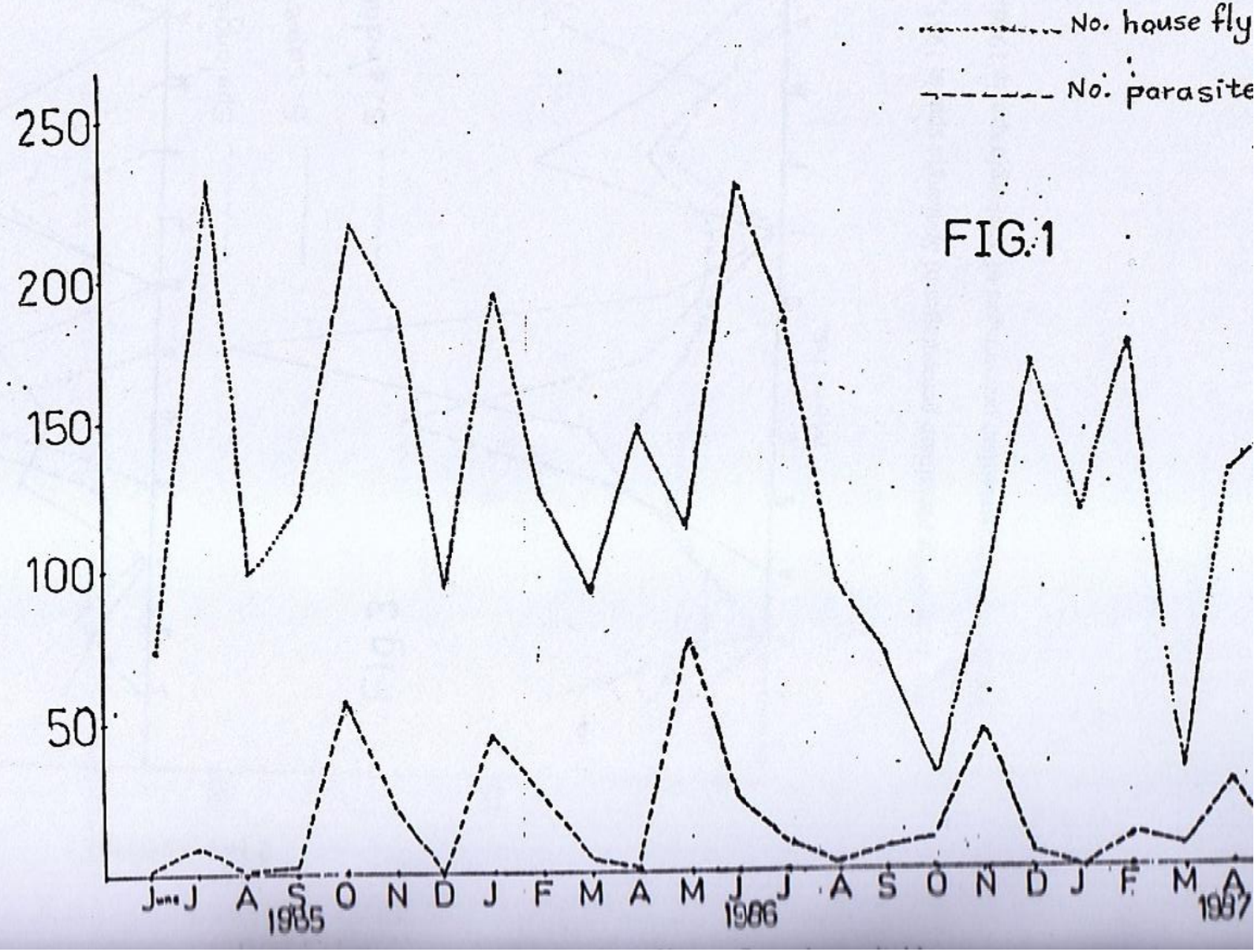
No. house fly
No. parasite
250
200
150
100
50
J
J
A
S
O
N
D
J
F
M
A
M
J
J
A
S
O
N
D
J
F
M
A
1985
1986
1987

FIG. 1

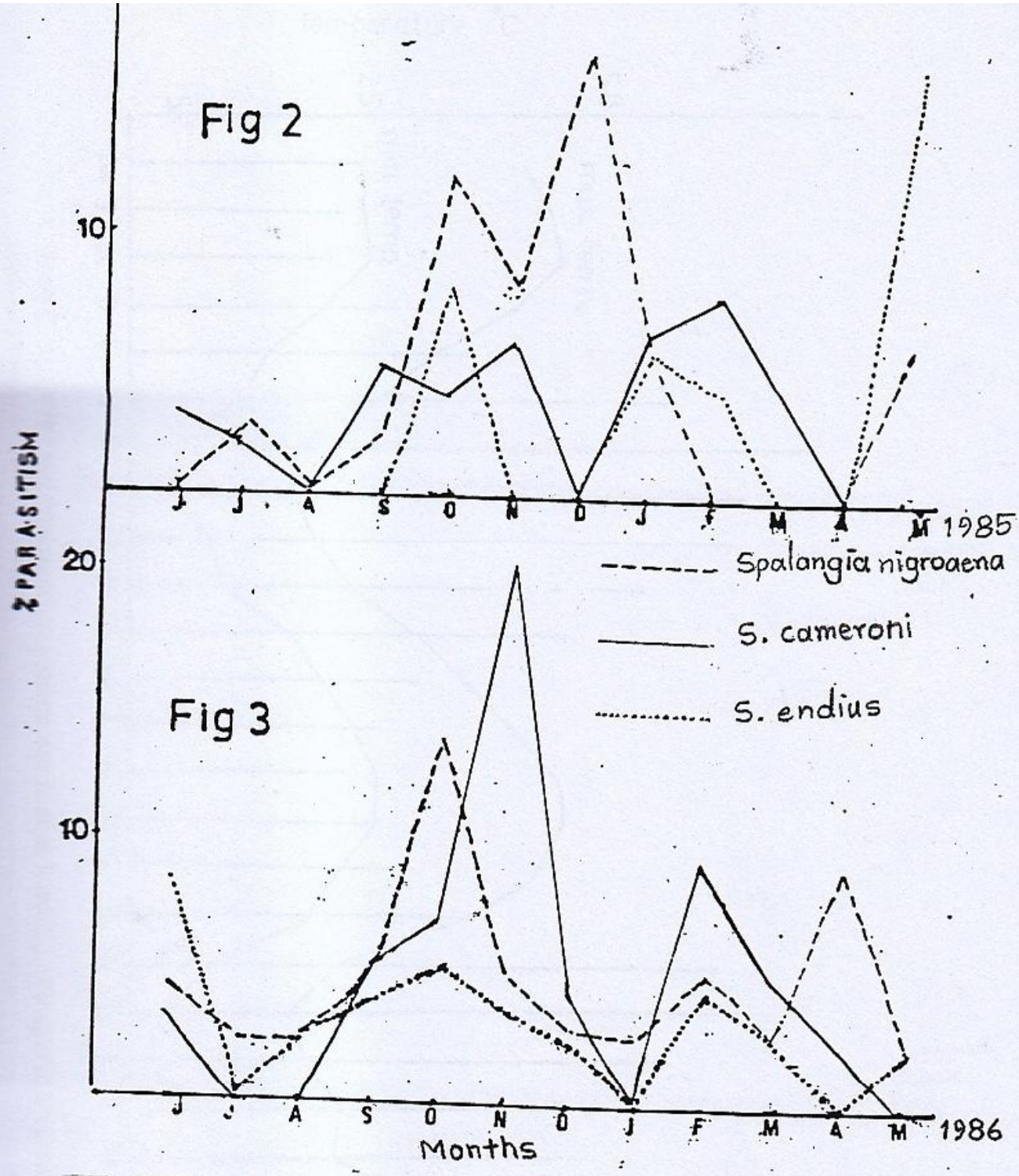

Fig. 2: Monthly parasitism percentages of *Spalangia* spp. in 1985-1986.

Fig. 3: Monthly parasitism percentages of *Spalangia* spp. in 1986-1987.

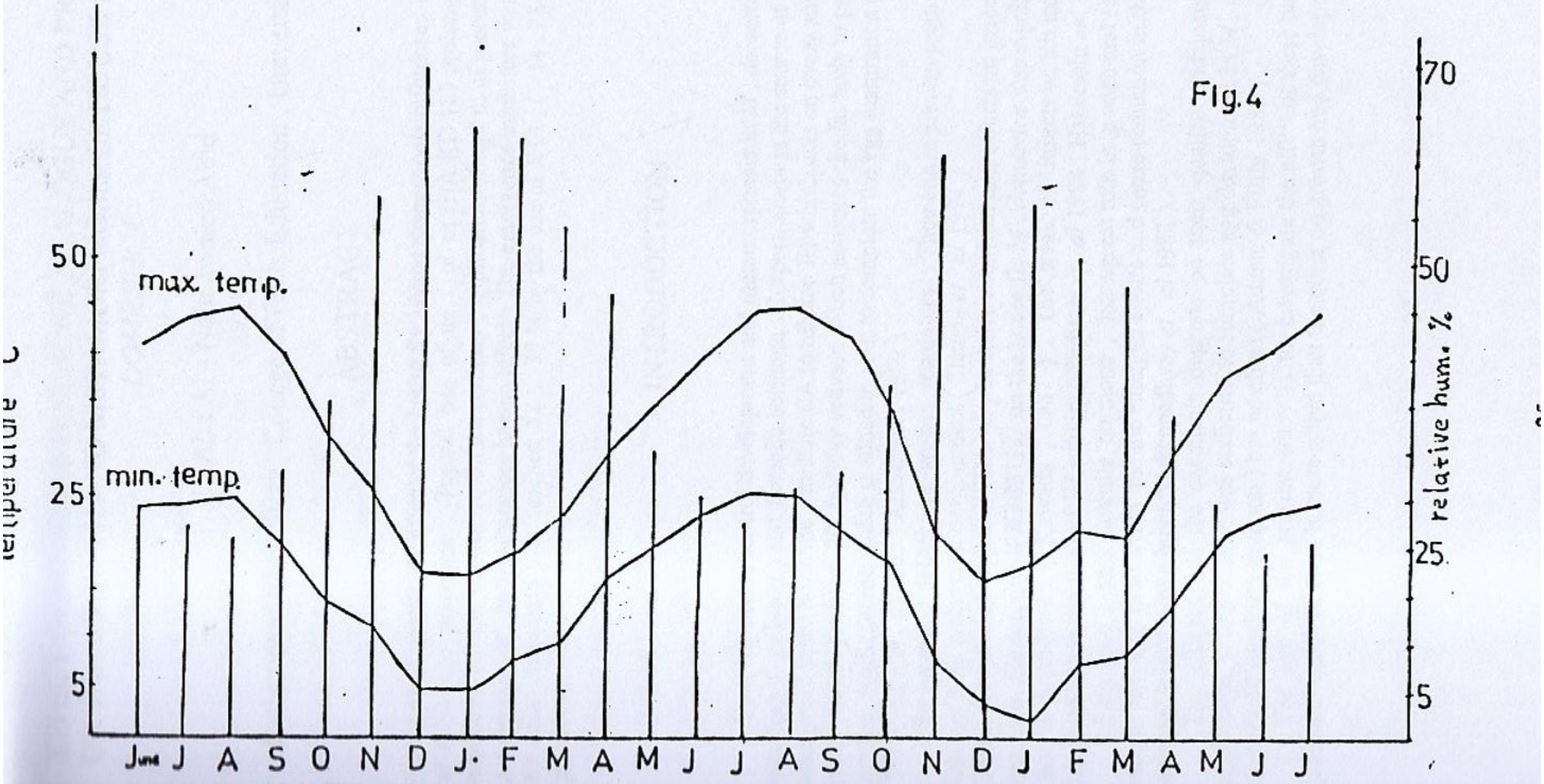

Fig. 4: Monthly maximum and minimum temperature and relative humidity of Baghdad area during the two years of study.