

ce of the problems. In Caspian sea areas case numbers were higher in spring and summer whereas in Persian gulf the highest rate were found in spring and winter. Most of the bites in Caspian sea were from dogs (%72) followed by wild animals such as wolves, foxes and jackals. In Persian gulf zones stray dogs and wild rodents were more involved in bites than the other animals. The study was shown that border areas of the country in north and south house a variety of mammalian wildlife which threaten the human population health. On the basis of the results, recommendations were made of measures to prevent or control the animal bites.

INTRODUCTION

Like most other countries in the world, Animal bites is a big health problem everywhere in Iran and certainly have become of major public health significance. Animal bites may lead to dangerous infections such as rabies, pasteurellosis, leptospirosis, hydatidosis, brucellosis, cat scratch fever, tularemia and tetanus that may incapacitate or kill the victim (4,6,8,11,13,14). Furthermore, injuries caused by animal bites may result in permanent scars, severe disability and even death (2,11). Losses such as: treatment of person bitten, use of personnel in the control of such cases, loss of work days, physical and psychic damages to the victim are other important factors which could consider relative to animal bites (2,11).

The average attendance of new cases at the District Health Offices for treatment and advice within the framework of the antirabies activities of the Ministry of Health, Treatment and Medical Education runs to over 15629 annually. More than 60% of the victims are taking antirabies vaccine and serum and about Rls 407,000,000 is spent annually for medical care and public health activity (Table 1).

The purpose of this study was to determine the incidence of reported animal bites on human beings in two selected areas in Iran to elicit some of the basic facts about animal bites. In addition, data on some factors which might be associated with animal bites were collected and analyzed. A goal was to define through this study some appropriate ways to prevent and to control rabies and other zoonoses by preventing animal bites.

MATERIALS AND METHODS

Undoubtedly, daily reports of persons bitten from northern provinces (Caspian sea areas) and cities from southern parts (Gulf coasts) of Iran was the main reason to select these two distinct areas for epidemiological survey of animal bites and consequently rabies dilemma.

The source of cases for this study was the reported bites to the 26 District Health Offices of these two regions during the period of five years(1981-85). This was on the basis of Iran Pasteur Health Protocol that in endemic areas of rabies all animal bites cases must

be reported immediately to District Health Offices in order to determine whether or not the involved animal is rabid, so that the victims bitten may be treated accordingly.

To have a comprehensive data, special forms which completed by health officers were collected and organized for tabulation and/or graph. From the gathered data variables such as age, sex and occupation of the person bitten; the anatomical site of the bite; geographical location, where the bite occurred; date and hour of the bite and characteristics of involved animal were considered for statistical analyzing using Chi-Square test(12).

For the human population at risk, demographic data was taken from the Government Census Year Book of 1976. It had the best available data for use in this study.

RESULTS

During the five years period (1981-85) a total number of 14239 animal bites cases were reported to 26 District Health Offices in two selected areas (Table 2) of which, 12043 cases (84.57%) were occurred in two provinces of Gillan and Mazandaran of Caspian sea areas, whereas the remaining 2196 cases (15.43%) were happened in Kerman/Baluchistan, Hormozgan and Bushehr provinces of Persian gulf coasts. The overall incidence of animal bites in Caspian sea and Persian gulf areas was 42.85 and 18.16 per 10,000 of the human population per year respectively. The number of cases reported to and recor-

ded by health offices in these two areas increased from 2856 in 1981 to 5899 in 1985 with the most significance increase in the last two years, this is also true for considering these two areas separately (Figure 1). There is no significance distribution of animal bites cases between different geographical locations in these two areas (Map 1,2).

The distribution of animal bites cases among male and female are similar both from the Caspian sea and Persian gulf areas. From the total number of reported animal bites cases in Caspian sea areas, 8213 (68.20%) occurred in males, and 3715 (30.83%) occurred in females (Table 3). A chi-square test did show a significance difference among the age groups related to the sex of the person bitten ($P < 0.05$). The percentage of victims less than 24 years of age for males and females were 57.84% and 56.02%, respectively. In Persian gulf areas of the overall population of persons bitten, 1579 bites (71.90%) occurred among male and 607 (27.64%) among females. The chi-square test also revealed a significant difference among the age groups related to the sex of the person bitten ($P < 0.05$) (Table 4). In both areas the majority of bites occurred in individuals between the age of 13 to 24 (Figure 2).

In Caspian sea areas, approximately 56.74% of the animal bites occurred in young persons which includes pre-school children, school aged children and students, this is also similar in Persian gulf coasts (Table 5).

The only significant point on the other occupational groups is the highest percentage of farmers and workers in these two selected areas.

From the total of reported animal bites in Caspian sea areas 8791 (72.99%) of them occurred in rural residence, while, only 3252(27.00%) occurred among urban inhabitants. This is also true for Persian gulf areas (Figure 3).

As indicated in table 6 and 7 and shown in figure 4 animal bites have followed a definite seasonal pattern in these two areas, in Caspian sea areas the number of bites rises during spring to a summer peak and falls in autumn and winter, while in Persian gulf coasts an increase in the number of reported animal bites were found in spring and winter.

There were 925 (42.12%) animal bites occurring at 6A.M. through 12A.M. in Persian gulf coasts (Figure 5) and 4015 (33.33%) cases of bites taking place during 12A.M. through 6P.M. in Caspian sea areas (Figure 6). A chi-square test indicated a significant association between the hour of the bite and the season in which the animal bite occurred ($P < 0.05$) (Table 6&7). In Caspian sea and Persian gulf areas, most of the bites from 6A.M. through 6P.M. were among individuals less than 24 years of age (Tables 8&9). A chi-square test did show a significant difference among the age groups related to the hour of the bite ($P < 0.05$).

In Caspian sea areas bites by stray dogs account

for 71.99% of all the bites reported, followed by wolves (2.27%), foxes(1.78%), jackals (1.49%) and the remaining 22.47% by a variety of species(Table 10,. In Persian gulf zones stray dogs (69.03%) and rats(7.28%)were more involved in bites than the other animals(Table 11).

In general, as shown in figure 7, 82.56% of the reported animal bites were on the extremities, where 49.20% and 33.36% involved the lower and upper extremities, respectively. Bites about the head, face, neck (12.46%) and trunk (5.01%) were next most frequent.

DISCUSSION

From the public health point of view, there has been considerable attention to the problem of pollution and pollutants by the health organization and experts. One such form of pollution that is becoming a significant factor in the daily life of the urban and rural dwellers, is the large number of stray dogs and including wild life which is wandering in the vicinity of the towns and agricultural areas in search of food (2). In Iran like in many countries in the world it is impossible to segregate the problem of animal bites and scratches for that of rabies because of the fear of rabies the degree of reporting cases day by day is going up. From the data which was collected for this study we can draw a more or less similar epidemiological pattern of animal bites in these two selected areas. It is important to realize that these data are related to "reported bites"and do not

show the "true" incidence of animal bites as undoubtedly many bites go unreported. It can be noticed that the number of animal bites cases in both areas follows the same pattern during the five years period of the study with the most significant increase in the last two years of 1984, 1985, while a part of this increase can be attributed to the great awareness of the problem arises from the animal bites to immediate report of cases but for the 1982, 1983 we don't have a solid reason to explain. A high incidence rate of such cases in Caspian sea areas reveals that the people of northern provinces were more in attacked, which is probably due to the high population of stray dogs, the dense forests and existance of Alborz mountain which is given a specific ecological system in that area, has increased the chance of the people to come in contact with wild life. In contrast the low incidence rate of animal bites in southern parts of the country, near gulf coasts perhaps is due to existance of geographical characteristics in those areas which is mostly covered by desert, therefore it has got a peculiar pattern of wild including domestic animals. Bites by stray dogs account for 71.99% in Caspian sea and 69.03% in Persian gulf of all the bites reported, respectively, followed by wolves, foxes, jackals in Caspian sea, rats and the other wild carnivores and domestic animals in Persian gulf coasts, thus stray dogs were the most offending animals in both areas. From observation made in this study it is obvious that bites are a big problem

in rural areas. The distribution of bite cases among the sex and age groups are similar in both areas. In relation to the sex of the person bitten, males were more often involved than females. The proportion of males bitten was found to be almost twice that of females. For all age groups the proportion of males bitten was higher than that of females. These findings are harmonize with the results of other authours (2, 7, 9, 11). Victims ze with the results of other authours (2,7,9,11). Victims less than 24 years of age had the highest rates of animal bites. This finding is also in agreement with those made by Brobst and Co-workers (1959), Berzon (1972) in the United States of America, Banerji (1974) in India, Pascal and Perez Barrientos (1974) in Sacramento County, California (1,2,3,11). Such persons have the greatest risk of incurring dog bites, perhaps because they are often more in association with and more abusive to animals specially dogs. The results in both areas clearly indicate that the daytime between 6 A.M. to 6P.M. specially late afternoon and early evening hours and good weather seasons are crucial periods which corresponds generally to both human and animals particularly canine activity (7,10). Multiple body wounds are not uncommon in animal bite incident (1,11). As indicated Figure (7) most of the bites were inflicted on the extremities. The probalbe rason for this is that the majority of bite victims use their extremities specially right arms and legs in defending themselves for any attacking animals. The easiy approac-

hability of children's faces during attack, specially dog shows the high proportion of facial bites among children (7).

The results of present study indicate that in Caspian sea and porsian gulf areas and also in other parts of the country the number of person bitten by stray dogs and other wild and domestic animals has risen stedily, therefore, a surveillanc system to which all bites are required to be reported and as Berzon stated that a full-time Veterinarian should be appointed to serve as health officer and consultant on animal control matters is strongly recommended(2). In addition to that the recommendati-on and suggestion of the Expert Committee on rabies of the World Health Organization can be implemented as an effective means on controlling of animal bites (2). Finally as indicated by Zvi Cochavy a fundamental part of prevention of animal bites and scratches should be taught particularly to school childran, about habit and care of domestic animals, learning how to handle animals, not to disturb them (5).

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reports and additional data for this study.

TABLE (1)- Reported bites and suspected rabid animal in Iran,
1981-85

Year	Animal bites cases	Death from rabies	Animals examined for rabies	Number positive
1981	7364	41	418	291
1982	12550	40	not known	553
1983	14769	25	742	659
1984	20813	17	not known	762
1985	22646	19	932	740
TOTAL	78142	142	-	3005

* Based on information from Pasteur Institute of Iran.

Annual average of animal bites cases = 15629 Persons.

Annual medical care expenses Rls 407,000,000

TABLE (2) - Animal Bites reported in Caspian sea and Persian gulf areas, 1981-1985

Region /Province	Animal Bites Cases					Total	"Population at risk"	**Rate/10,000/Year
	1981	1982	1983	1984	1985			
IRAN								
Caspian sea								
Mazandaran	1315	590	696	1410	2500	6511	2810502	42.85
Gillan	1250	454	478	1300	2050	5532		
Persian gulf								
Kerman, Baluch.	130	60	51	132	310	683		
Hormozgan	110	33	43	116	620	922	1209251	18.16
Bushehr	51	27	32	62	419	591		
TOTAL	2856	1164	1300	3020	5899	14239	$X_4^2 = 427 > X_{4,0.95}^2 = 9.488$	

* Population according to The Government Census Year Book of 1976.

** Estimated annual animal bites rate by the formula:

$$IR = \frac{\text{New Animal bites cases}}{\text{Population at risk}} \times 12 / 12 \times 10,000$$

TABLE (3) -Age and sex distribution of reported animal bite victims, Caspian sea areas, Iran, 1981-85.

Age of the person bitten(year)	Male	%	Female	%	Unknown	%	TOTAL
<6	324	3.94	328	8.82	0	0	652
7-12	1482	18.04	675	18.16	8	6.95	2165
13-24	2946	35.86	1079	29.04	7	6.08	4032
25-42	1906	23.20	866	23.31	5	4.34	2777
>43	1275	15.52	636	17.11	0	0	1911
Unknown	280	3.40	131	3.53	95	82.60	506
TOTAL	8213		3715		115		12043
%	68.20		30.83				

$$\chi^2_4 = 73.99 \quad \chi^2_{4,0.95} = 9.488$$

TABLE (4) -Age and sex distribution of reported animal bite victims, Persian gulf areas, Iran, 1981-85.

Age of the person bitten (year)	Male	%	Female	%	Unknown	%	TOTAL
<6	85	3.38	70	11.53	1	10	156
7-12	210	13.29	80	13.18	0	0	290
13-24	510	32.29	125	20.59	2	20	637
25-42	400	25.23	170	28.00	0	0	570
>43	295	18.68	145	23.88	0	0	440
Unknown	79	5.00	17	2.80	7	10	103
TOTAL	1579		607		10		2196
%	71.90		27.64		0.45		

$$X_4^2 = 50.41 > X_{4,0.95}^2 = 9.488$$

TABLE (5) - Occupational distribution of reported animal bite victims, Caspian sea and persian gulf areas, Iran, 1981-85.

Group	Caspian sea areas		Persian gulf areas		TOTAL
	No. of bite cases	%	No. of bite cases	%	
Pre-school children	652	5.41	155	7.05	807
School children	2157	17.91	290	13.20	2447
Students	4025	33.42	635	28.91	4660
Farmers	2010	16.69	310	14.11	2320
Workers	730	6.06	292	13.29	1022
Business men	562	4.66	114	5.19	676
Domestic work in own house and yard	1315	10.91	211	9.60	1526
Unknown	592	4.91	189	8.60	781
TOTAL	12043		2196		14293

TABLE (6) - Distribution of reported animal bites cases in Caspian sea areas, Iran, 1981-85, by hour of the bite and season of occurrence.

Hour of the bite	Seasons			TOTAL	
	Spring (March, 21-June, 21)	Summer (June, 22-Sept, 22)	Autumn (Sep t, 23-Dec, 21)		Winter (Dec, 22-March, 20)
6 A.M.-12 A.M.	910	1140	780	995	3825
12A.M.-6 P.M.	900	1295	760	1060	4015
6 P.M.-12 P.M.	685	420	155	175	1075
Unknown	149	232	182	160	723
TOTAL	2969	3912	2307	2855	12043

$$X_9^2 = 143.97 > X^2 = 16.919$$

9, 0.95

TABLE (7) -Distribution of reported animal bites cases in Persian gulf area, Iran, 1981-85, by hour the bite and season of occurrence.

Hour of the bite	Seasons				TOTAL
	Spring (March,21-June,21) (June,22-Sept,22) (Sept,23-Dec,21) (Dec,22-March,20)	Summer	Autumn	Winter	
6.A.M.-12 A.M.	235	200	160	330	925
12A.M.-6P.M.	100	80	100	155	435
6 P.M.-12 P.M.	100	105	165	120	490
12P.M.-6A.M.	50	60	50	100	260
Unknown	30	20	26	10	86
TOTAL	515	465	501	715	2196

$$\chi^2_9 = 63.31 \quad \chi^2_{9,0.95} = 16.919$$

TABLE (8)- Distribution of reported animal bites cases in Caspian sea areas, Iran, 1981-85, by age of the person bitten and hour of the bite

Age of the person bitten(Year)	Hour of the bite					Unknown TOTAL
	6 A.M. -12 A.M.	12 A.M. -6 P.M.	6 P.M. -12 P.M.	12 P.M. -6 A.M.	Unknown	
<6	261	266	90	35	0	652
7-12	700	850	410	130	75	2165
13-24	1400	1312	882	330	108	4032
25-42	840	1025	610	255	47	2777
>43	610	540	370	320	71	1911
Unknown	14	22	43	5	422	506
TOTAL	3825	4015	2405	1075	723	12043
χ^2	31.76	33.33	19.97	8.92	6.00	

$$\chi^2_{12} = 253.13 > \chi^2_{12,0.95} = 21.026$$

TABLE (9)- Distribution of reported animal bites cases in persian gulf areas, Iran, 1981-85 by age of the person bitten and hour of the bite

Age of the person bitten (Year)	Hour of the bite					Unknown	TOTAL
	6 A.M.	12 A.M.	6 P.M.	12 P.M.			
	-12 A.M.	-6 P.M.	-12.P.M.	-6 A.M.			
* < 6	103	15	0	0	38	156	
7-12	168	60	45	17	0	290	
13-24	278	139	150	70	0	637	
25-42	213	120	158	79	0	570	
> 43	150	95	112	83	0	440	
Unknown	13	6	25	11	48	103	
TOTAL	925	435	490	260	86	2196	
%	42.12	19.88	22.31	11.83	3.91		

$X_9^2 = 135.608 > X_{0.95}^2 = 16.919^2$
 *The age arroup 6 and 7-12 were combined for the X^2 test in order to avoid the lack of information in the column 6 P.M.-12 P.M., 12 P.M.-6 A.M. corresponding to the age group 6.

TABLE (10)- Animal bites reported in Caspian sea areas, Iran, 1981-85, by animal species.

Year	Biting animal													TOTAL	
	Dag	Wolf	Fox	Jackal	Panther	Bear	Wildpig	Cat	Horse	Mule/Donkey	Cattle	Sheep	Rat		Unknown
1981	1847	76	46	46	46	5	8	86	21	23	26	15	14	306	2565
1982	751	34	16	36	20	8	9	15	12	8	17	9	32	77	1044
1983	845	29	12	22	15	9	4	10	16	9	10	8	15	170	1174
1984	1951	52	36	40	17	7	3	4	13	21	32	10	9	515	2710
1985	3276	83	105	36	32	3	26	95	21	30	26	32	28	757	4550
TOTAL	8670	274	215	180	130	32	50	210	83	91	111	74	98	1825	12043
% of TOTAL	71.99	2.27	1.78	1.49	1.08	0.26	0.41	1.74	0.69	0.75	0.92	0.61	0.81	15.15	

TABLE (10)-Animal bites reported in Caspian sea areas, Iran, 1981-85, by animal species.

Year	Biting animal							TOTAL		
	Dog	Wolf	Fox	Jackal	Cat	Rat	Rabbit		Cattle	Unknown
1981	188	2	7	0	20	51	3	13	7	291
1982	43	18	14	16	14	8	2	4	1	120
1983	46	15	16	26	7	16	0	0	0	126
1984	116	30	29	35	16	39	7	16	22	310
1985	1123	50	43	26	39	46	3	10	9	1349
TOTAL	1516	115	109	103	96	160	15	43	39	2196
% of Total	69.03	5.23	4.96	4.39	4.37	7.28	0.68	1.95	1.77	

FIGURE (1) - Animal bites reported in Caspian sea and Persian gulf areas, Iran, 1981-1985.

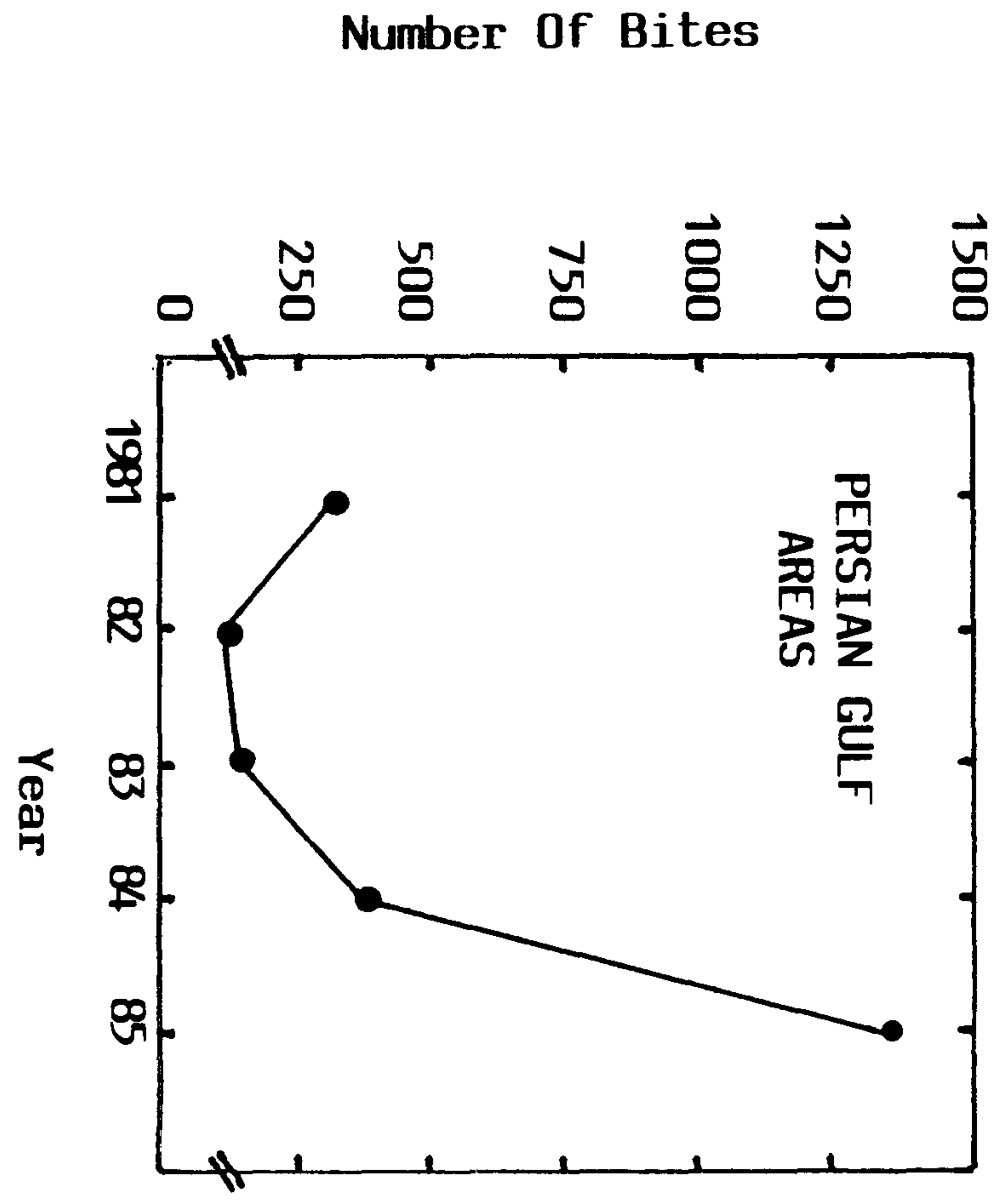
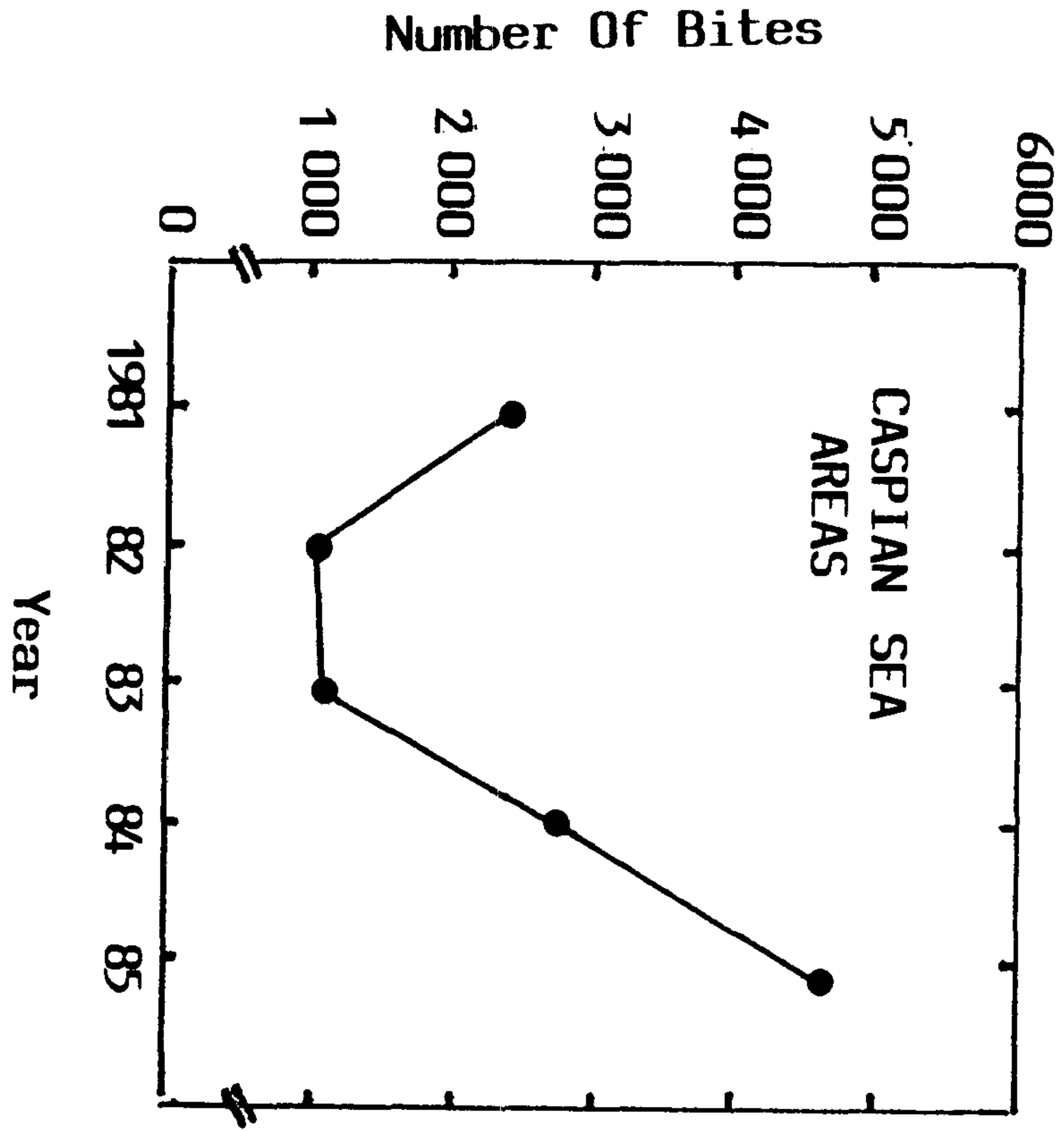


FIGURE (2) - Age of reported animal bites cases in Caspian sea and Persian gulf areas, Iran, 1981 - 85

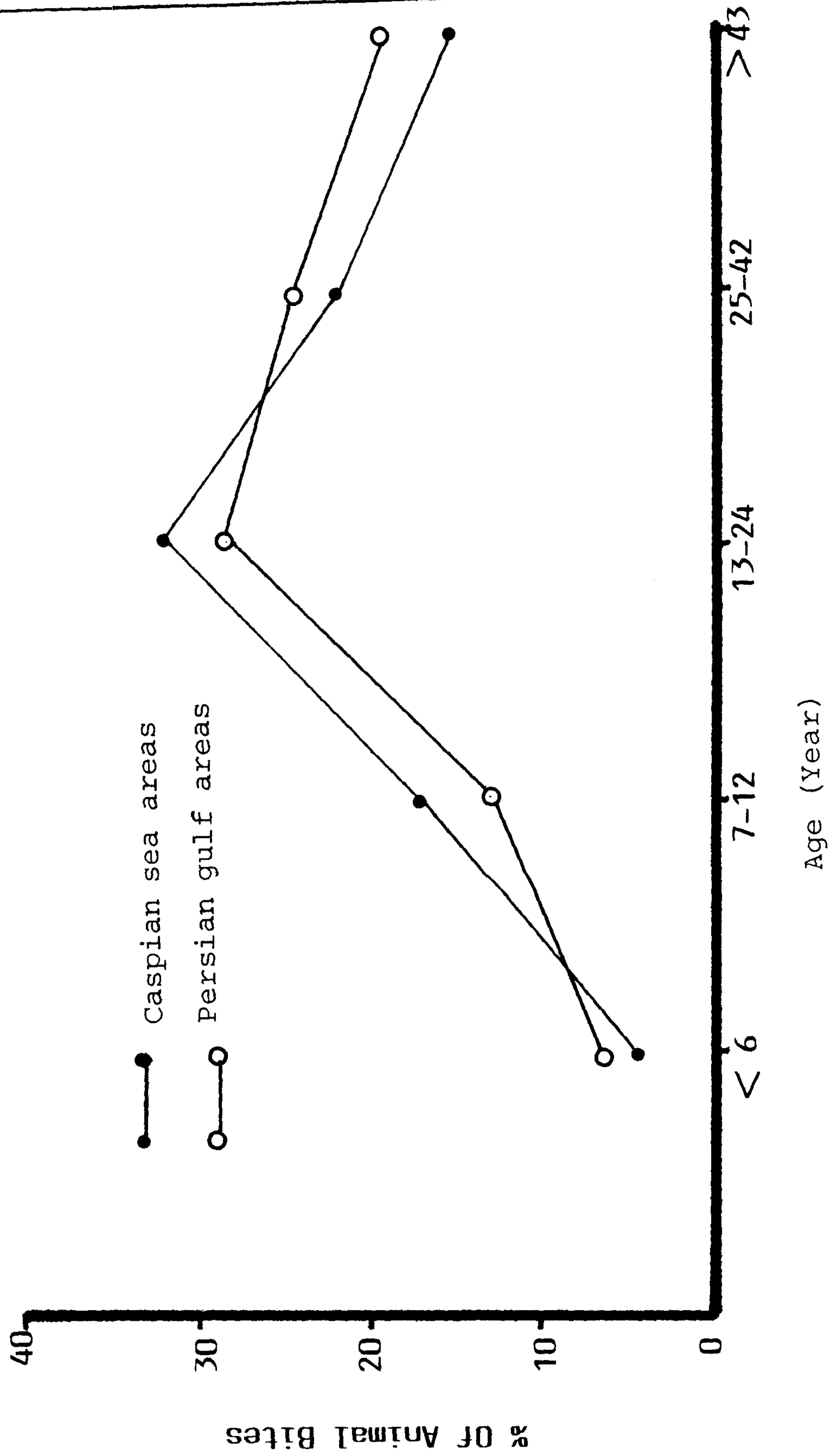
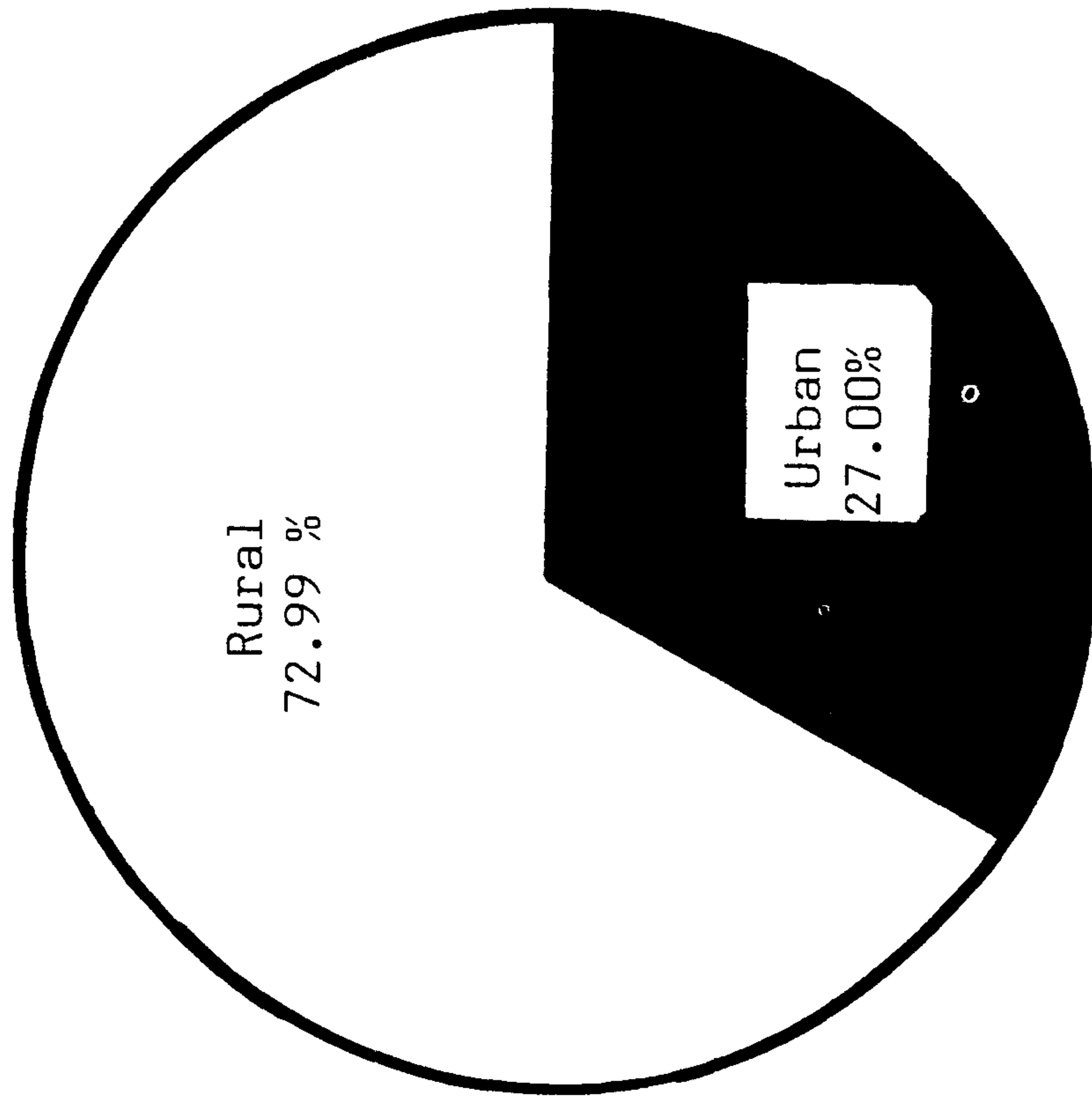
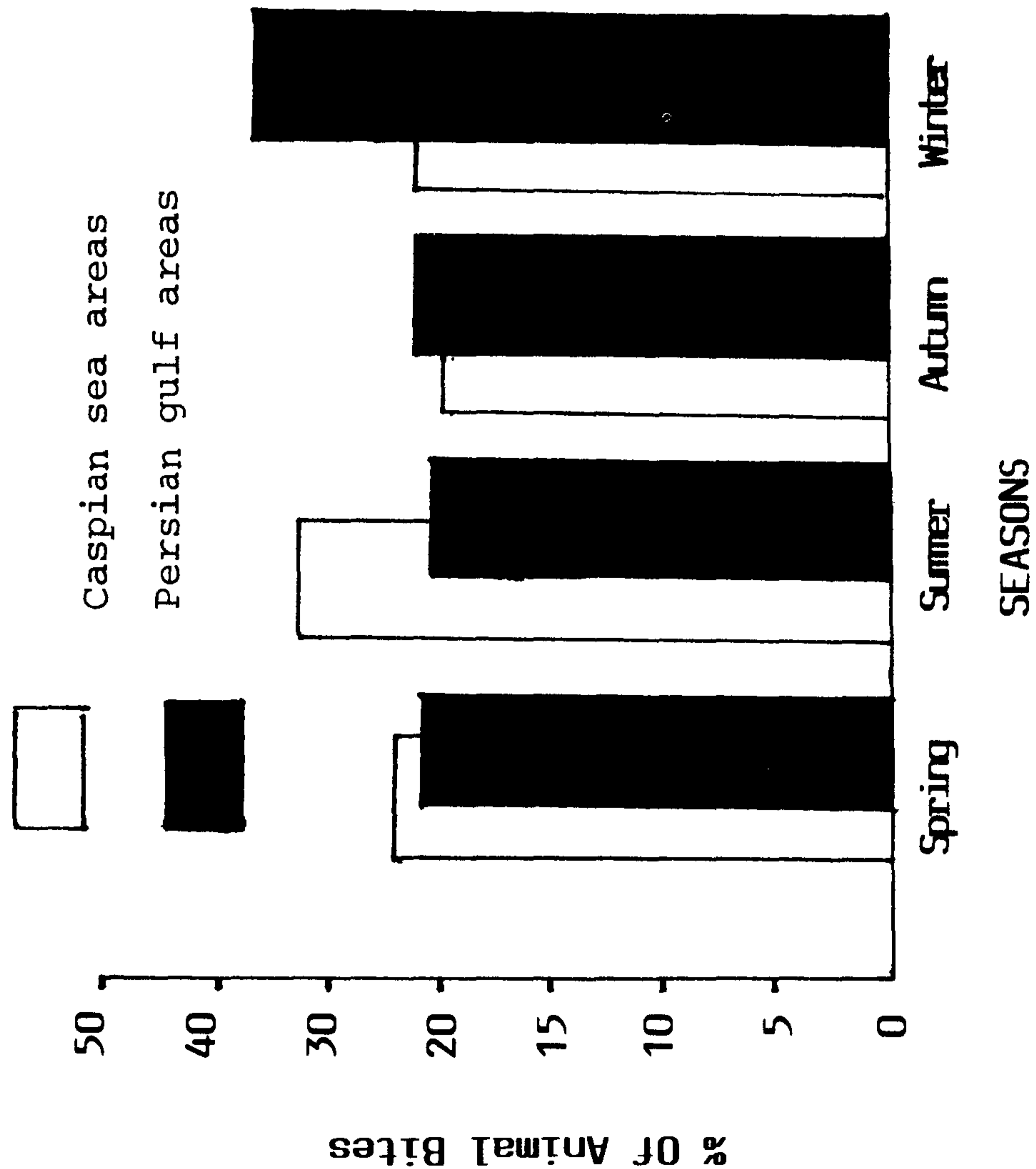


FIGURE (3) - Distribution of reported animal bites cases in Caspian Sea and Persian gulf areas, Iran 1981-85, by type of residence of bitten persons.



FIGURE(4)- Seasonal distribution of reported animal bites cases in Caspian sea and Persian gulf areas, Iran, 1981-85



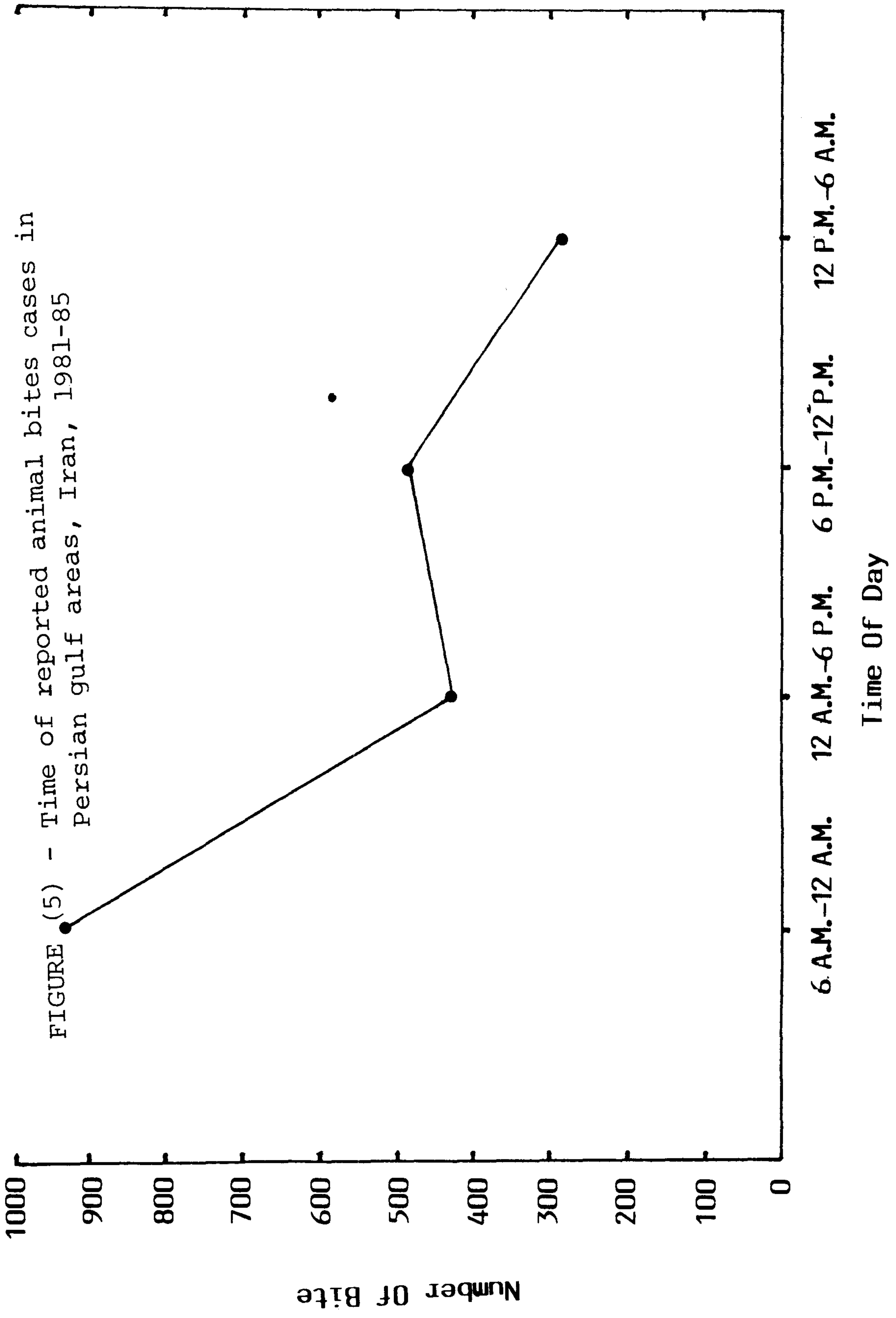


FIGURE (5) - Time of reported animal bites cases in Persian gulf areas, Iran, 1981-85

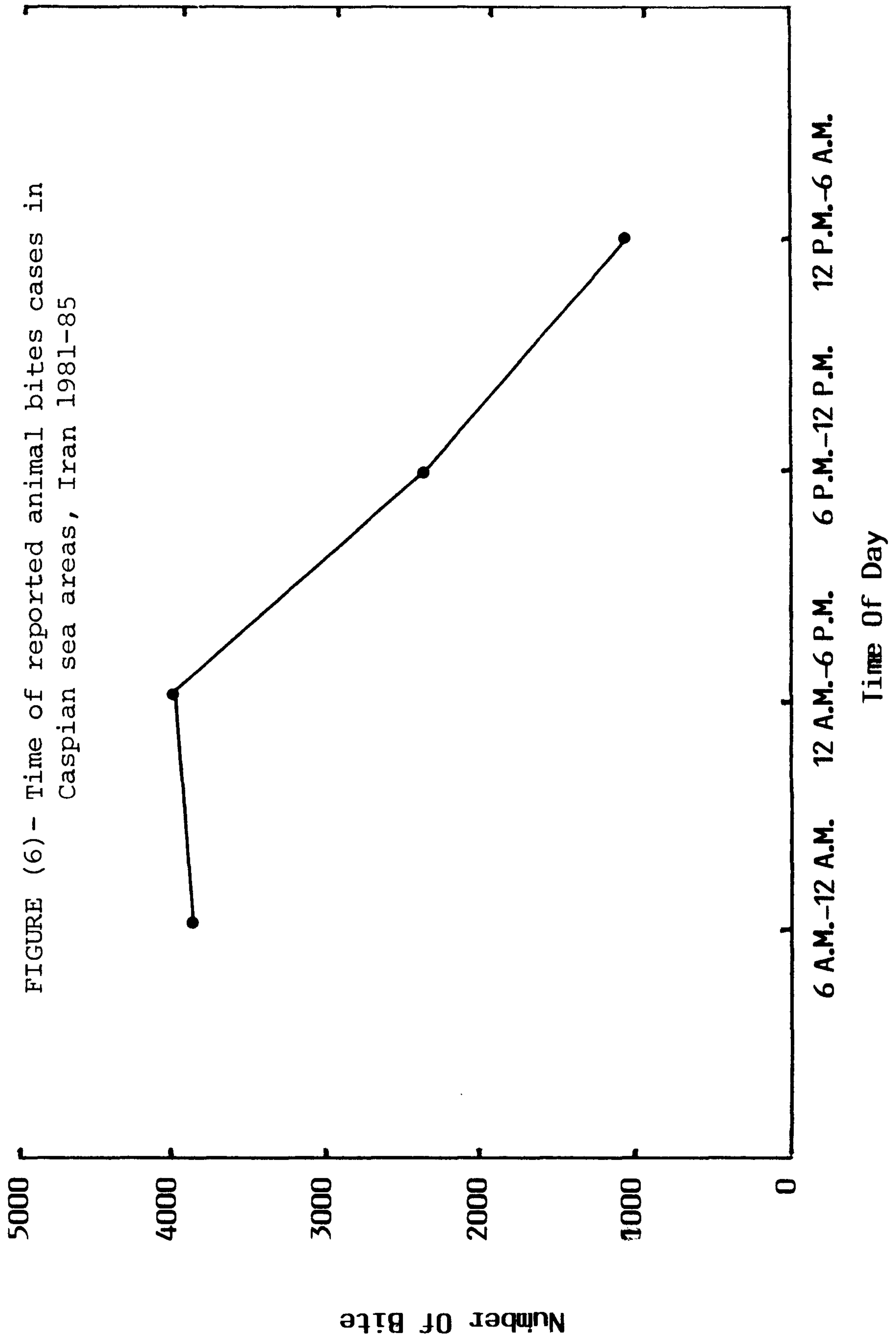
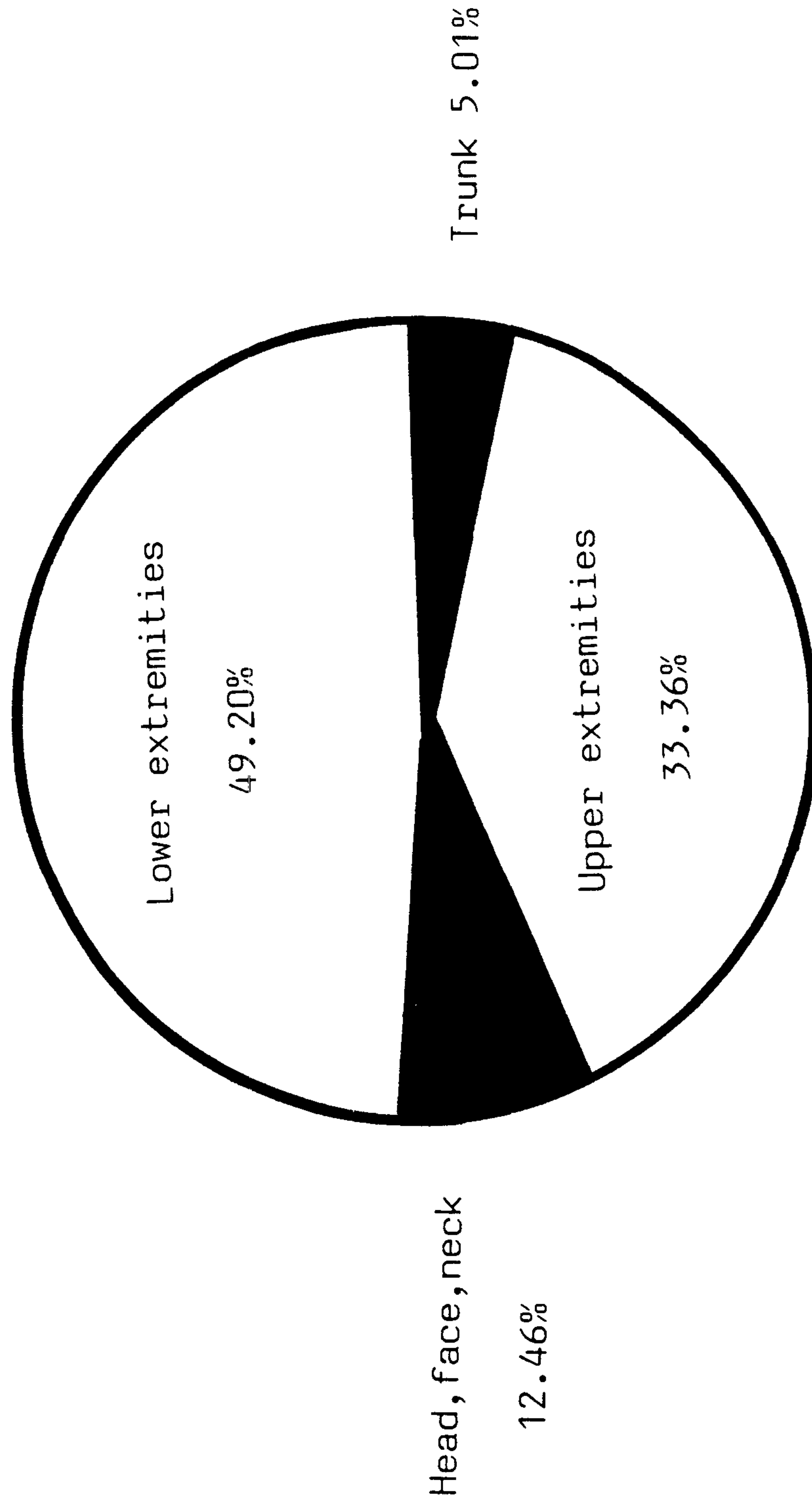
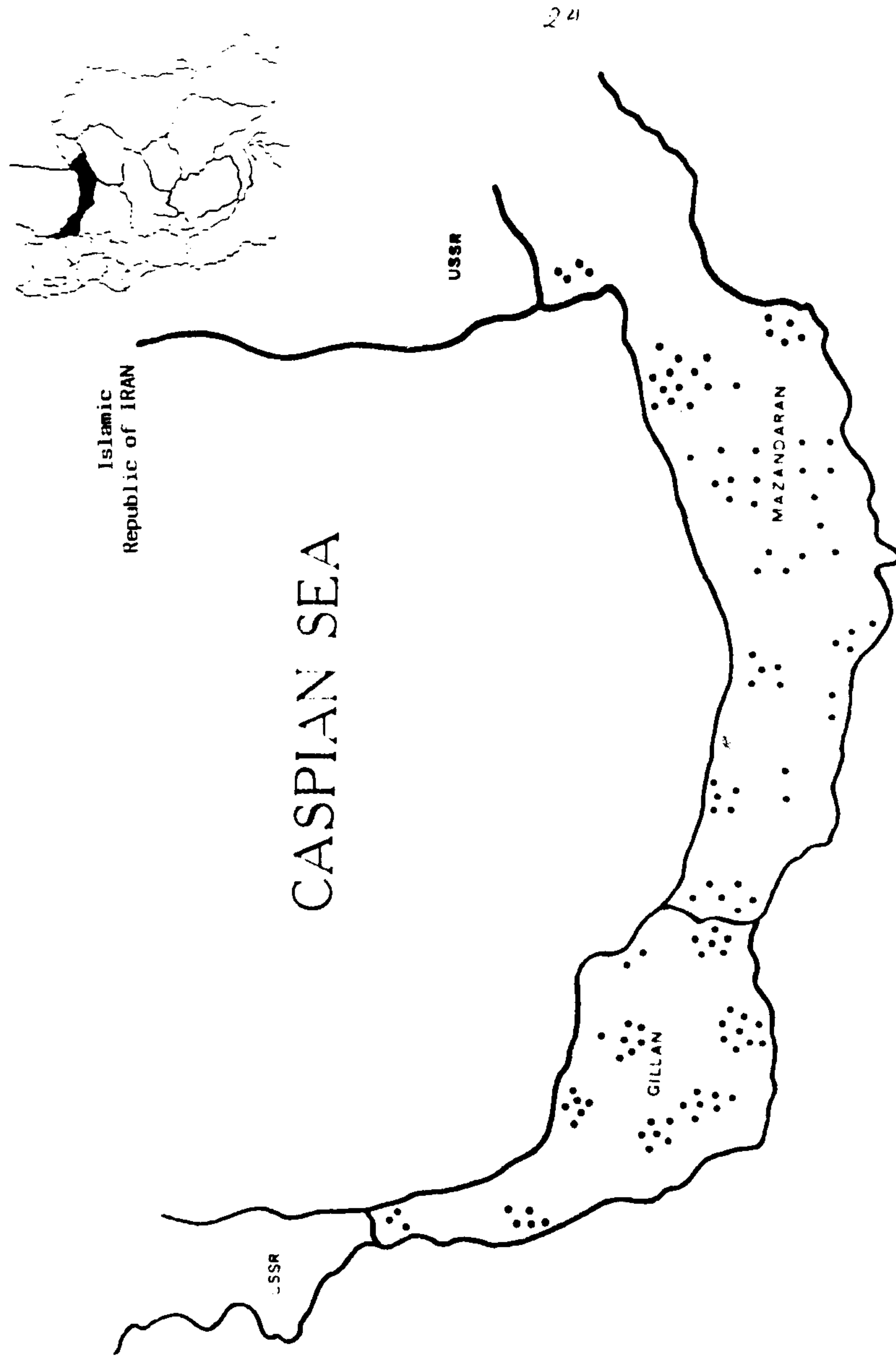


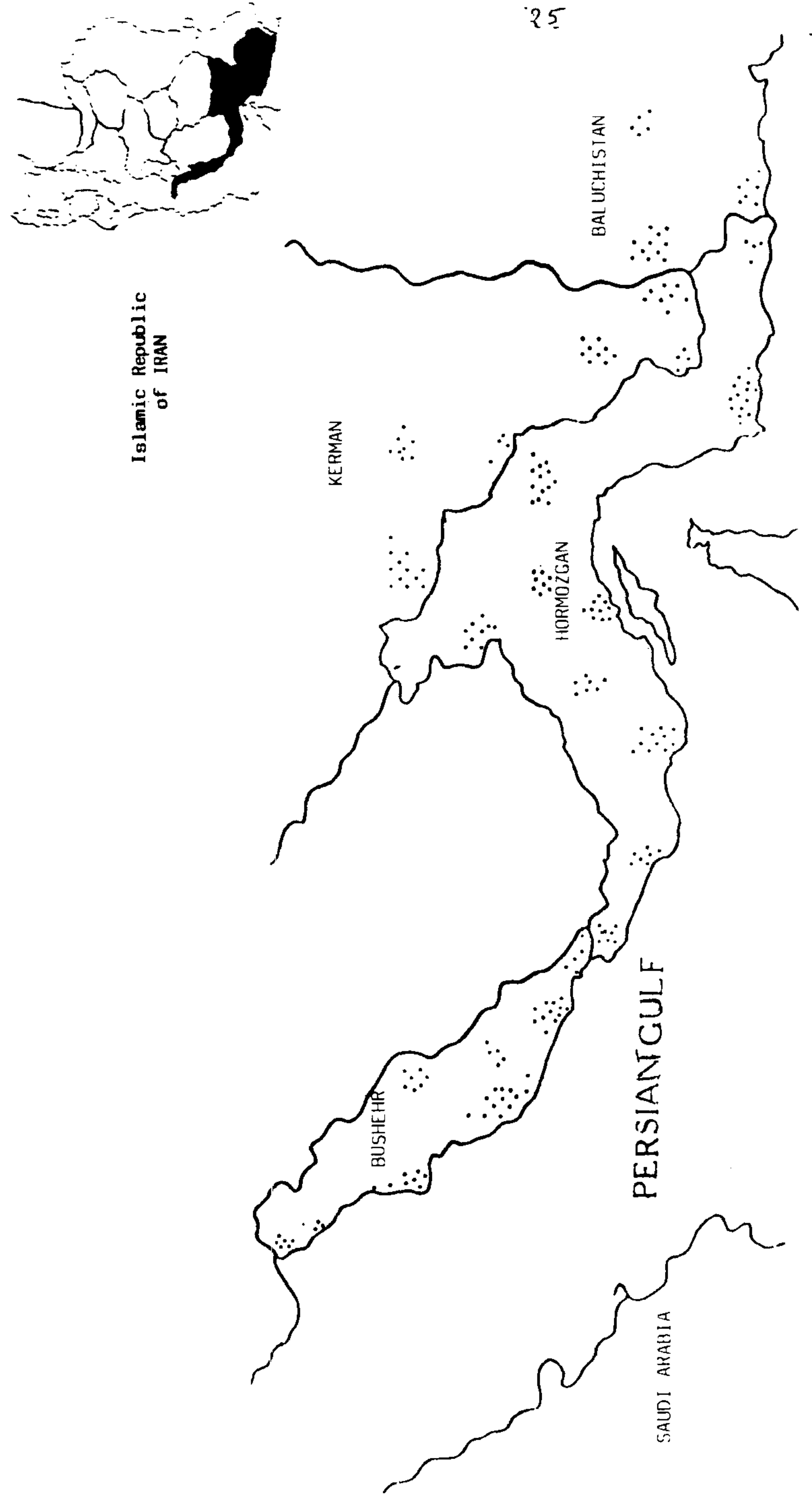
FIGURE (7)- Anatomical locations of reported animal bites on human beings, in Caspian and persian gulf areas, Iran, 1981-85.





MAP (1)- Animal bites reported in Caspian sea areas, Iran, 1981-85

● equal to 100 persons bitten



MAP (2) - Animal bites reported in Persian gulf areas, Iran, 1981-85

● equal to 10 persons bitten

مطالعه مزبور نشان داد که نواحی مرزی کشور در شمال جنوب مأمّن پستانداران وحشی گوناگون بوده بطوریکه بهداشت جمعیت انسانی نواحی مزبور را تهدید می نمایند . براساس نتایج بدست آمده در رابطه با اقدامات پیشگیری و کنترلی از گازگرفتگی به توصیه های لازم مبادرت گردید .

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گازگرفتگی توسط حیوانات . تجزیه و تحلیل آماری موارد گازگرفتگی
در سواحل خلیج فارس و کناره دریای مازندران - ایران .

دکتر ایرج نوروزیان * دکتر احمد فیاض ** دکتر سوسن سیمانی **

دکتر ماشالله اصولی **

بمنظور بررسی سیمای اپیدمیولوژیکی گازگرفتگی توسط حیوانات در دو ناحیه خلیج فارس و دریای خزر مطالعه‌ای بر روی ۱۴۲۳۹ مورد گازگرفتگی در فاصله سالهای ۱۹۸۱ و ۱۹۸۵ صورت گرفت و اطلاعات مربوط به سن، جنس شغل افراد گازگرفته شده، ناحیه جغرافیائی که گازگرفتگی در آن حادث گشته زمان و ساعت وقوع گازگرفتگی و خصوصیات حیوان گازگیرنده جمع آوری و مورد تجزیه و تحلیل آماری قرار گرفتند تا باین نکته پی برده شود که کدامین یک از فاکتورهای بر شمرده شده در فوق حائز اهمیت می باشند. میزان وقوع گازگرفتگی توسط حیوانات در مجموع در دو ناحیه کناره دریای خزر و سواحل خلیج فارس به ترتیب ۴۲/۸۵ و ۱۸/۱۶ در ۱۰۰۰۰۰ نفر جمعیت انسانی در سال محاسبه گردید. تعداد موارد گزارش شده مثبت شده توسط ادارات بهداشتی در این دو ناحیه از ۲۸۵۶ مورد در سال ۱۹۸۱ افزایشی تا میزان ۵۸۹۹ مورد در سال ۱۹۸۵ داشته بطوریکه این افزایش در دو سال ۱۹۸۴ و ۱۹۸۵ چشمگیرتر می باشد. نوسان فصلی در رابطه با وقوع معضل مزبور وجود داشت. در نواحی کناره دریای مازندران موارد گازگرفتگی در فصول تابستان و بهار بیشترین میزان را داشته در حالیکه در سواحل خلیج فارس در بهار و زمستان گازگرفتگی بیشتر حادث گردیده است. بیشتر موارد گازگرفتگی در کناره دریای خزر توسط سگ (۷۲٪) و بدنبال توسط حیوانات وحشی نظیر گرگ، روباه و شغال بوقوع پیوسته است. در سواحل خلیج فارس سگان و لگرد و جوندگان وحشی در میان دیگر حیوانات بیشترین موارد را بخود اختصاص داده اند.

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