

A survey on frequency of infection to the virus of enzootic bovine leukosis in dairies around Tehran.

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Summary

Enzootic bovine viral leukosis not only can very much restricts cattle economics indifferent ways but also in the meanwhile investigation on the field of EBVL is be coming a model for oncology and studing some viral disease of mankind. So infection to the causative agent as well as the affection to the EBVL have been the subject of very many studies in most countries of the world. In IRAN for the first time by the use of AGIDT method we randomly tested 4797+130 serums of Holstein and native breed respectively. Results of this study indicates that a total of %9. 81 of the Hosltein breed are serum converted while none of native breed are serum positive. In the infeted dairies the rate of infection ranges between %0.5-41.76. From 31 tested dairies with Holstein 26(83. 87) are infected. It is concluded that in IRAN enzootic

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bovine viral leukosis is an exotic disease and in the affected farms contact and therefore crowding are very important in spreading the infection. In the meantime there is a significant relation between age, milk yield and number of parturition on the one hand and the rate of infection to the causative virus on the other.

INTRODUCTION

Years before the recognition of the causative virus of EBVL, in some parts of the world especially in Europe contagious bovine leukosis was known and its control was planned and with some success applied (46,12,20) .

In 1969 (1) for the first time, the causative virus of the disease was isolated and thereafter till now information on the virus itself and viral leukosis has been gaining.

On the basis of present knowledge the virus of EBVL has worldwide distribution (37,5,35,42) and in the infected herd of Cattle is transmitted both vertically and horizontally (47,21,28,43,42,37,7,8,36,38,23,45,44,9,34,33,30,22,32 15) .

A part from in breed susceptibility variation, the infection to EBL virus is much more prevalent in dairy than beef breed (36,7,8). In both breed, Cattle under the exposure of the virus either, in normal circumstances, genetically resists or infection stabilishes (7,18,15). In the latter case with some exception, after an incubation period of 4 years, the most important outcome

is the development of firm and white masses of malignant tumor in nearly all periferal and internal organs and tissues with different frequency and severity(41,7,42,41,38,29,48,42).

However, EBVL either by suden death (acute form of leukosis or lymphosarcoma of adrenal glands, spleen and abomasum) or by the decrease of Production and reproduction performance and carcass condemnation(chronic type of leukosis) directly threatens economic life of cattle considerably).

In addition economic effects of EBVL on the cattle (male or female) and sperm exportation would not be overlooked at all. finally it is worthwhile mentioning that the subject of leukosis to be a zoonosis is not yet dissolved (7,15,37,44).

It is the above mentioned importance of leukosis that EBVL has been the subject of very many studies in most countries of the world and this survey is one of those but a very limited one.

Materials and Method

In this survey 4797 Serum samples of holstein friesien breed from 31 dairy herds which located around Tehran were tested. in the meanwhile 130 serum samples from an IRANIAN native breed called Sarabi which raised in the suburbs of karaj (a City of Tehran province) as the same manner as hostein fiesien breed were also tested. Map No. 1 shows the distribution of tested herds. with one

exception (herd No.6) all tested Cattle were above 2 years old. In the meantime in order to Search thoroughly, on the native farm at the second sampling, blood was taken from a large numbers of one day old calves upto oldest Cows.

The test was done by the use of micro AGID method and the antigen was glicoprotein (gp) of EBL virus which was, in company with the standard antiserum, supplied generously by Kono(Japan) and the procedure was as the same as Kono et al (22) and the suspected cases were re-tested.

The interval between sampling and testing the samples was, never, more than 5 days and during this time the samples were kept in the refrigerator at 4^oc.

Results:

From 4797 samples 471 (9.81%) were seroconverted. 26 of 31 tested dairy farms were infected. This means that more than 83.87% of sampled herds were infected with EBL virus. In the infected herds the rate of infection varied between 0.5 and 41/76 (Table 1). on the basis of this results, there is no relationship between the population of infected herds and the infection rate of them (table 2 and fig 1). the distribution of infected cattle among age groups and parturition numbers in infected herds are shown in figures 2 and 3. It appears that there is not any regular trend between the infection

rate and the either of the two above mentioned Parameters. Anyhow, Statistical informations on one of the infected farms showed that there is a significant ($P = 0.05$) relationship between each of age, mean of daily milk yield, parturition numbers on the one hand and the infection rates on the other (table 3,4,5). In the meanwhile, on the same infected herd the duration between the time of Parturition and sampling date had no negative effect on the results of the test (table.6).

However none of the Cattle in native breed were seroconverted in two tests with an interval of at least 2 years between them. (Table,1)

Discussion

It is true that each of ELISA and RIA methods are more sensitive than AGIDT but on the basis of the present information the latter test has been well known as the standard one so for the identification of a herd infection rate is considered but not that of an individual Cow. Definitely doing AGIDT by the use of both p and gp Antigens gives more reliable results than each of the two. but because, 6 weeks after the establishment of infection, the majority of infected Cattle are seroconverted to gp antigen, it is now becoming an standard method to do AGIDT by making use of this antigen as we did (4,14,32,39,10.3,24,26,16,22,19,40,15,).

The most striking result of this survey was that

EBL virus has been introduced to IRAN by imported Cattle and the reasons for this claim are:

1- the infection is limited to holstein friesian breed either imported or Iranian in breed of this Cattle which are raised in intensive or semi-intensive manner and never have been in contact with native breed.

2- the origin of the imported cattle are the countries where infection with EBL virus is quite common. 3- none of the Cattle in native breed which tested twice were seroconverted (table 1).

On the basis of this results it is clear that only in infected herd the intensivity and especially contact inbetween different age groups are the two very important factors in spreading the causative virus and increasing the rates of infection (table 2). This conclusion is in accordance with the findings of others in the one hand and on the other it indicates what means by the enzooty of BVL (7,35,8,33,15,42).

The relationship between age and infection rates is well known (42,39, 7), and the two parameters, namely parturition numbers and daily milk yeild not only are closely related to age but also stresses resulted from high milk production and parturitions can make the cattle more sensitive to both infection and affection as it can be seen on table 3,4,5.

In our opinion, in infected herds application of hygienic regulations which definitely increases mean of age groups can raise the infection rates. in addition unste-

rilized means for bleeding, injection, vaccination dehorning, tattooing and artificial insemination as well as the infected bull can transmitt EBL virus (15,36,25,26,27,11,13,42,7,10) and increase the rates of infection. Because of these various tools of Transmission it should not be surprising to see high infection-rates in either of well managed and populated farms or poorly managed and populated ones (table 2).

At the first look to figure 3 one might finde some what different from all mentioned above, but it is not so. This figure shows an unpleasant fact that the 2-3 yrs age group is dominant in nearly all herds and this is so because of not only tuberculosis and brucellosis are under eradication program but also the poor hygien and not to tuckle properly with the diseases and affected animals. under such situation many cattle especially above 3 years old are culled.

Recommendations

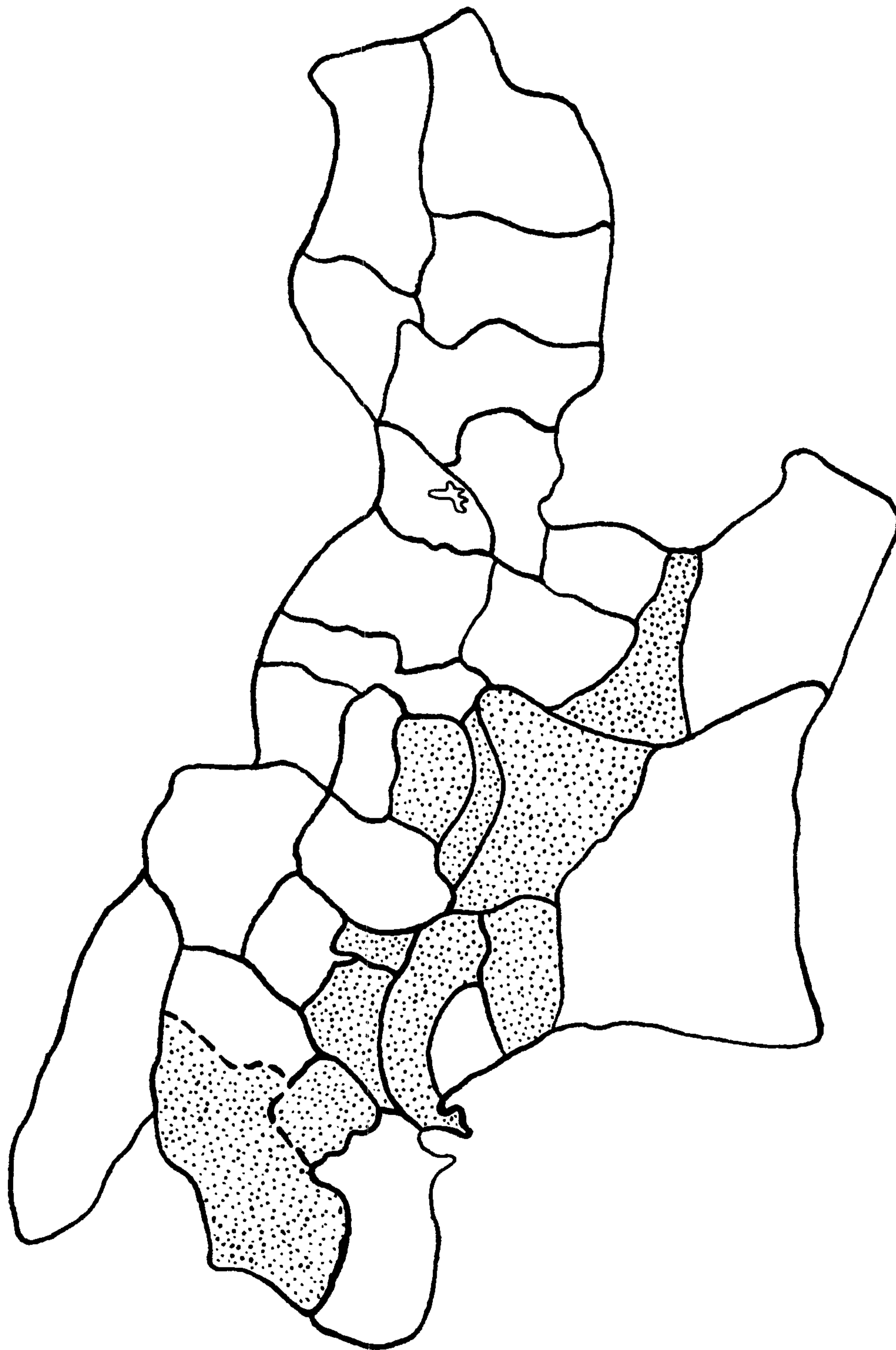
In IRAN it is not economically wise to go through an eradication plan for leukosis bu the three following practicable points should be considered exactly:

- 1- Importaion of Cattle (female and male) and sperum only from leukosis free herds should be permitted.
- 2- At least every 3 month serums collected for brucellosis eradication should go under the test of AGIDT and for the replacement purpose all seroconverted Cattle raised together and separate of the others.
- 3- The infected Herdsmen should not mixed attle of dif-

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ferent age groups, should not make use of unsterilized means for bleeding, injection, vaccination, dehorning, artificial insemination and infected bull as well, should separate calves from their dams as soon as delivered and feed them with boiled, mixed clostrom and milk.

Map.1. Tehran Province and the Subrubs



Doted areas were under survey

Table 1- Rate of infection to the causative agent of enzootic bovine viral leukosis

Herd No	No. of Samples Per herd	No. Positive	Rate of Infection %	Herd No.	No. of Samples Per herd	No. of Positive	Rate of infection %
1	63	10	15.78	17	9	0	0
2	49	1	16.33	18	102	0	0
3	40	3	7.5	19	198	1	0.5
4	31	2	6.45	20	278	35	9.26
5	167	32	19.16	21	44	4	9.09
*6(1)	241	0	0	22	29	0	0
*6(2)	73	0	0	23	210	58	27.62
7	139	6	4.32	24	153	35	22.87
8	314	21	6.69	25	91	38	41.76
*9(1)	225	11	4.89	26	30	11	36.67
*9(2)	89	7	7.86	27	50	1	2
10	252	20	7.94	28	50	6	12
11	188	34	18.08	29	50	1	2
*12(1)	470	0	0	30	16	0	0
*12(2)	325	17	5.23	31	118	30	25.42
13	43	2	4.65				
14(1)	182	19	10.44				
*14(2)	80	20	25				
15	143	27	18.88	**32(1)	32	0	0
16	37	4	10.81	**32(2)	98	0	0
Total No. of Samples (Holstein)				Total No. of Positive		Mean rate of infection %	
4797				471		9.87	

* - Numbers in brackets represent reactivity of sampling in the same farms. with an interval of at least 6 month

** - Native breed (sarabi) which, in this case raised as the same as Holstein Friesien.

Table 2- Certain farming parameters and infection rates to EBVL on some infected herd

No. of Infected Herd	Popula- tion of infected herd	Mean of Daily Milk yeild/Cattle /kg	Rate of infection %	Origine of Cattle	Type of insemination	Source of Spermor Bull	Situation of animal contact on each Herd						
							Contact with the same age Di	Contact with older ones Indi	Contact with the same age Indi	Contact with Older ones Di			
18	200	21.0	0.0	U.S.A	Natural	Hol.Inbr/1.p	+	+	+	+	+	+	+
19	200	19.0	0.5	Nethrland	Natural	Hol.Inbr/1.p	***	+	+	+	+	+	+
3	90	20.0	7.5	*	Natural	Canadian	+	-	+	+	+	-	+
				Ho.Inbr /1.p	Natural	Hol.Inbr/1.p	+	+	+	+	+	+	+
2	100	17.0	16.33	Hol.inbr /1.p	Natural	Hol.inbr./1.p	****	x	x	x	x	x	x
24	1000	23.0	22.78	U.S.A	Natural	Hol.inbr./1.p	+	+	+	+	+	+	+
				U.S.A	Artificial	Canadian	-	-	-	-	-	-	-
23	1300	22.8	27.62	U.S.A	Natural	Hol. inbr./ Can.P	+	+	+	+	+	+	+
				U.S.A	Artificial	Canadian	-	-	-	-	-	-	-
25	600	23.0	41.76	U.S.A	Natural	Hol.inbr./1.P	+	+	+	+	+	+	+
				U.S.A	Artificial	U.S.A	-	-	-	-	-	-	-

*- Holstein inbreeding/ Iranian Product

**- Common Trough

***- Calf upto the first month of life maintained in a box

**** - Because of restriction of land nearly all population being in contact directly with each other

*****- One month before parturation pregnant Heifers and pregnant cattle live together

Table 3: Rate of infection in relation to Age

Age (Year)	A G I D T				Total	%
	+	-	-	-		
< 2	14	58	72		72	19.44
9	4	16	20		20	20.00
6	11	13	24		24	48.83
> 6	10	5	15		15	66.66
Total	39	92	131		131	-

$$X_3^2 = .17.31 \quad X_3^2 \text{ and } 0.95 = 7.815 \quad (P < 0.05)$$

Table 4: rate of infection in relation to herd mean milk yield
(Kg/day/Cattle)

Mean of Milk yield	A	G	I	D	T	Total	%
	+					-	
< 20	12			19		31	38.71
20-22.5	4			30		34	11.76
22.5-25	3			18		21	14.28
> 25	9			23		32	28.13
Total	28			90		118	-

$$x_3^2 = 7.90 \quad x_3^2 \text{ and } 0.95 = 7.815 \quad (P < 0.05)$$

Table 5- : rate of infection in relation to No. of Parturition

No. of Parturition	A G I D T				Total	%
	+	-	-	-		
1	15	67			82	18.29
2	3	7			10	30.00
3	2	7			9	22.22
4	8	3			11	72.72
> 4	11	5			16	68.75
Total	39	89			128	-

$$\chi^2_4 = 26.26 \quad \chi^2_4 \text{ and } 0.95 = 9.488 \quad (P < 0.05)$$

Table 6.: rate of infection in relation to interval (Month) between parturition and sampling

Interval between Parturition and samplin	A	G	I	D	T	Total
	+	-	-	-	-	
< 2	0	1				1
2-4	12	19				31
4-6	15	21				36
6-8	6	21				27
> 8	5	27				32
Total	38	89				127

$$\chi^2_3 = 7.13 \quad \chi^2_3 \text{ and } 0.95 \quad \text{NS}$$

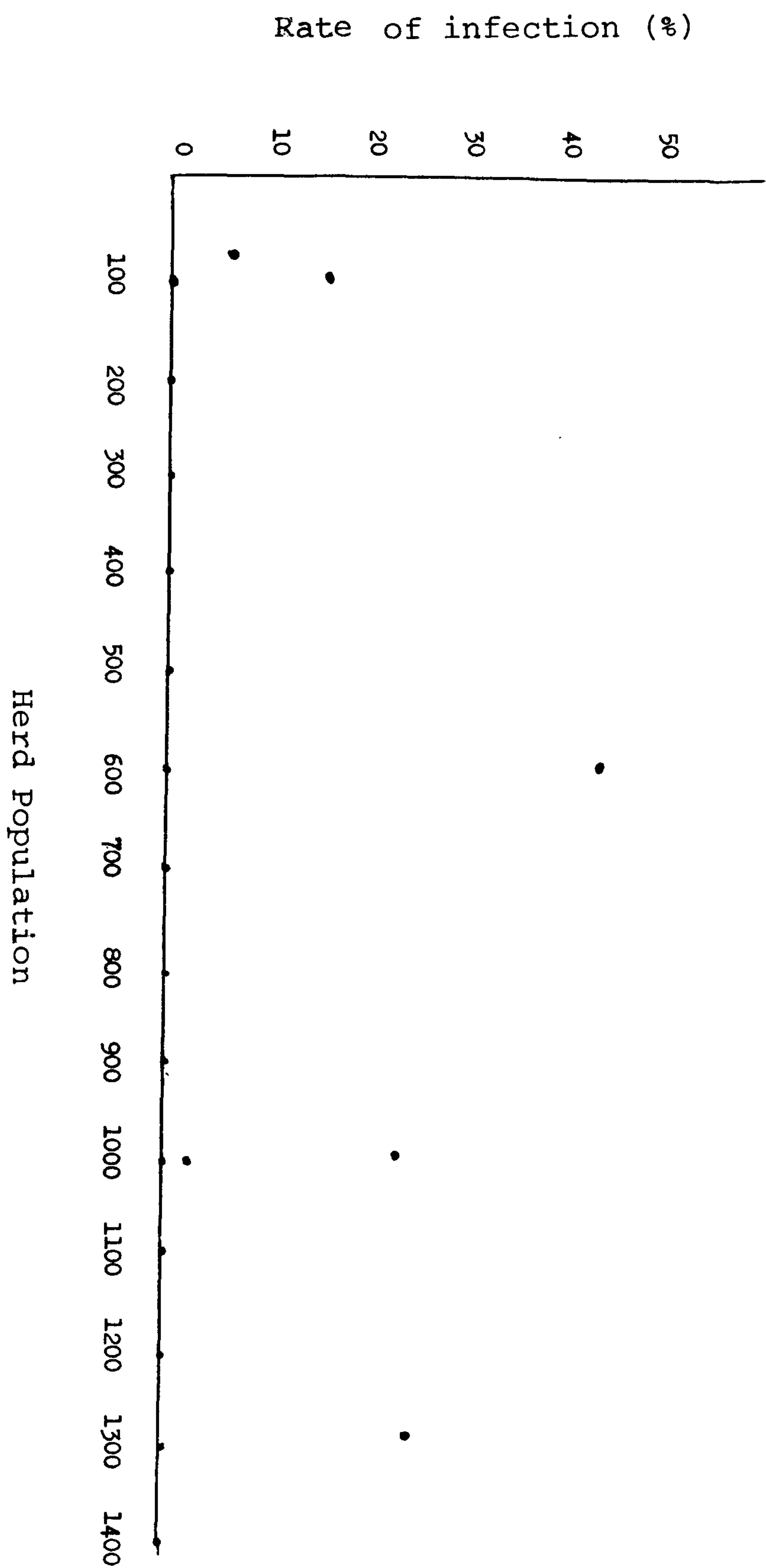


Fig. 1: Distribution of rate of infection (%) in relation to herds population.

Rate of infection (%)

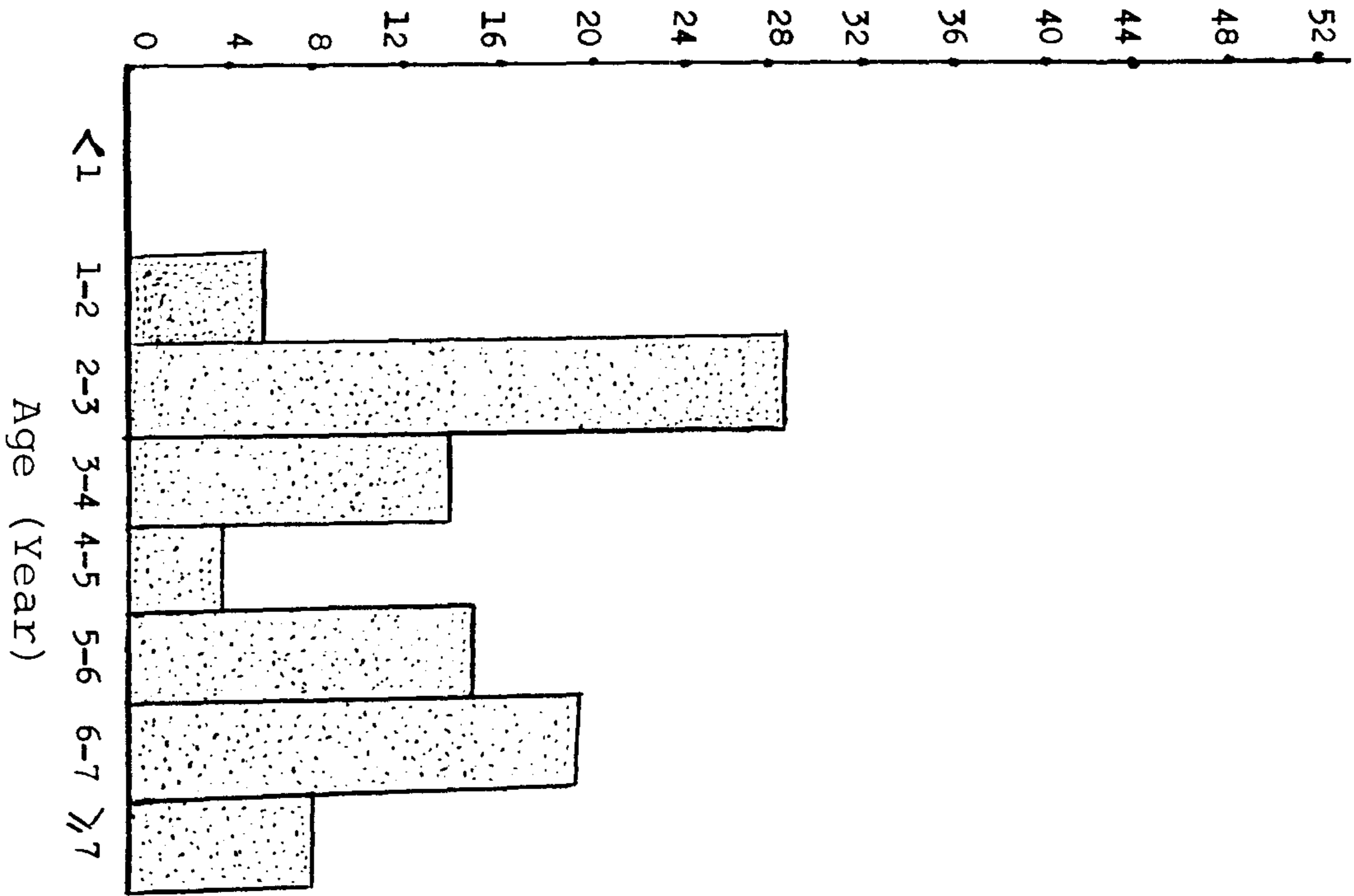


Fig. 2: Distribution of rate of infection (%) in different age group of cattle.

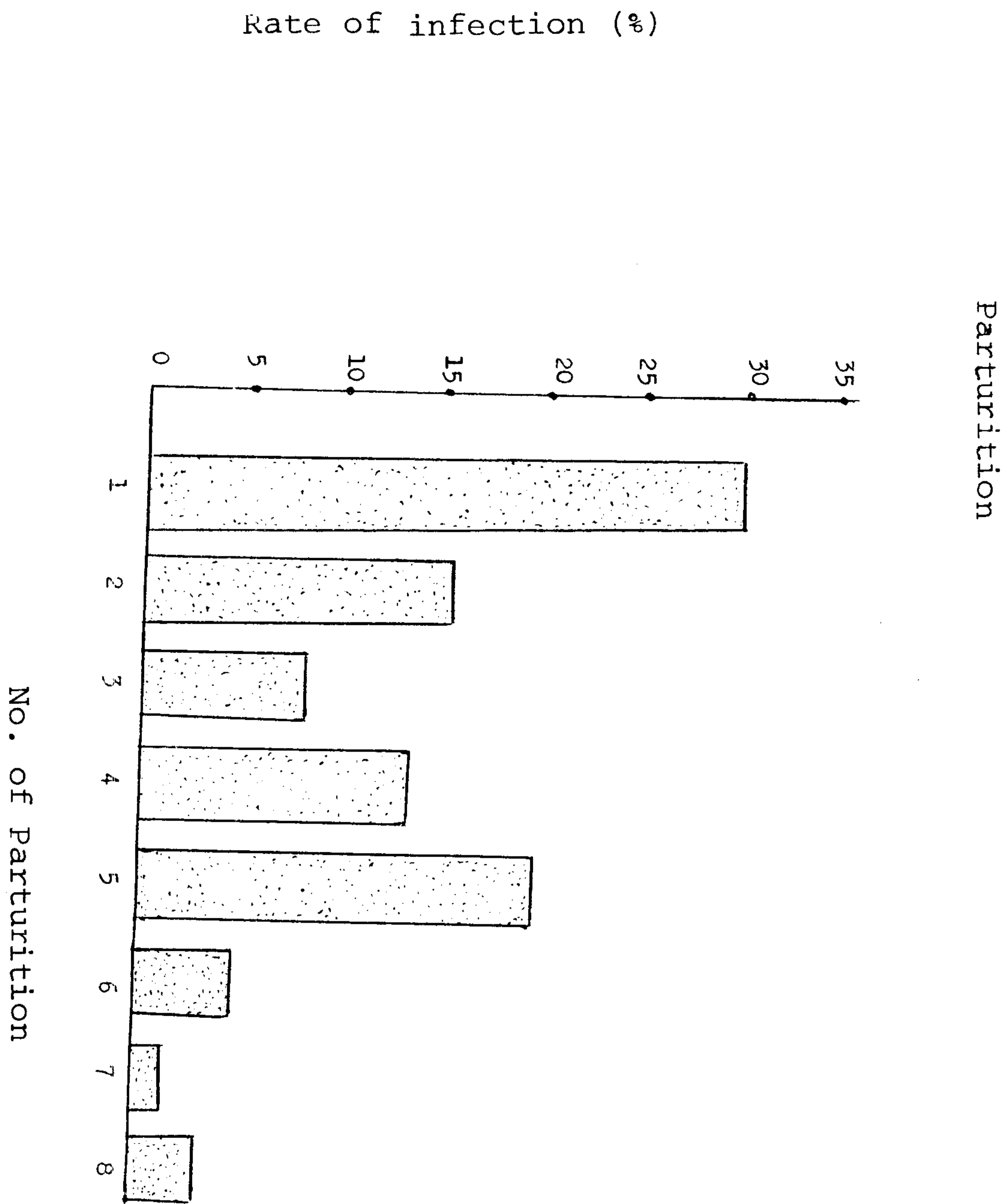


Fig. 3: Distribution of rate of infection (%) in herds on the basis of No. of Parturition

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بررسی فراوانی آلودگی به ویروس لوکوز آنزئوتیک گاودردامداریهای شیری اطراف

تهران

دکتر تقی تقی پور بازرگانی* دکتر عباس برین** دکتر حمید حدادزاده**

بدان علت که لوکوز آنزئوتیک ویروس گاو نه تنها ارزش اقتصادی گاو را به روش مختلف محدود میکند و بلکه سبب آنکه مطالعه پیرامون لوکوز میتواند بعنوان مدلی برای مطالعات تومور شناسی و بیماریهای ویروسی انسان بحساب آید، آلودگی به ویروس عامل لوکوز آنزئوتیک گاو و خود بیماری در بسیاری از کشورهای جهان به فراوانی مورد مطالعه قرار گرفته است، در ایران برای اولین بار ما با استفاده از روش AGIDT بطور اتفاقی ۱۳۰+۴۷۹۷ سرم به ترتیب از گاوان نژاد هلشتاین وبومی مورد آزمایش قرار گرفت. نتایج این مطالعه نشان میدهد که ۹/۸۱٪ از گاوان نژاد هلشتاین سرم مثبت بودند در حالیکه هیچ یک از گاوان بومی سرم مثبت نبودند. در گاوداریهای آلوده نسبت آلودگی بین ۴۱/۷۶-۵/۵٪ متغیر بود. از ۳۳ گله شیری از نژاد هلشتاین تحت مطالعه (۸۱/۸۱٪) ۲۷ آلوده بودند. در این بررسی نتیجه گرفته شد که در ایران لوکوز آنزئوتیک ویروس گاو وارداتی بوده و در گلههای آلوده تمامی و بنابراین تراکم در گسترش آلودگی نهایت اهمیت را دارند. نتایج این بررسی نشان داد که ارتباط بین سن، میزان تولید شیر و تعداد زایمان از یک طرف و نسبت آلودگی به ویروس عامل بیماری از طرف دیگر از نظر آماری با اهمیت بود.

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