Table 7. Result of diagnostic services - Sheep -

Name of disease	1977/'78	'78/'79	'79/'80	'80/'81	'81/'82	Total
Contagious pustular dermatitis		1/1				1/1
Coli bacteriosis			3/2		2/2	5/4
Coccidiosis					3/2	3/2
Paramphistomum infestation			1/1			1/1
Strongyloidosis	3/1			8/3	15/15	26/19
Bunostomum infestation			1/1			1/1
Haemonchiasis			2/1	9/2	8/6	19/9
Trichuris infestation			1/1	1/1	1/1	3/3
Oesophagostomum infestation				1/1		1/1
Ostertagia infestation					1/1	1/1
Hematodirus infestation				1/1		1/1
Scabies		5/1				5/1

The denominator shows the number of applications pronounced as showing the disease, and the numerator shows the number of animals pronounced as infected by the disease.

Table 8. Result of diagnostic services - Goat -

Name of disease	1977/'78	'78/'79	'79/'80	'80/'81	'81/'82	Total
Hemorrhagic septicemia	1/1					1/1
Coli bacteriosis					1/1	1/1
Staphylococcosis					1/1	1/1
Strongyloidosis			2/2	2/2	22/8	26/12
Trichuris infestation					1/1	1/1
Ostertagia infestation				1/1	13/2	14/3
Haemonchiasis	2/1	3/2		6/6	13/8	24/17
Demodiciaosis					20/1	20/1
Scabies					3/1	3/1

The denominator shows the number of applications pronounced as having the disease, and the numerator show the number of animals pronounced as infected by the disease.

Table 9. Result of diagnostic services - Swine -

Name of disease	1977/'78	'78/'79	'79/'80	'80/'81	'81/'82	Total
Rabies				1/1		1/1
Tuberculosis					1/1	1/1
Brucellosis	2/1	6/3				8/4
Swine pasteurellosis	18/12	13/13		1/1	1/1	33/27
Coli bacteriosis		7/2	26/12	4/4	4/2	41/20
Salmonellosis			11/2	1/1		12/3
Streptococcosis			1/1	1/1		2/2
Aspergilosis				8/2		8/2
Toxoplasmosis		37/3				37/3
Coccidiosis		4/2	15/9	1/1		20/12
Strongyloidosis	5/2	20/5	10/6	1410	13/4	62/27
Ascariasis	5/4	19/10	3/1	4/3	10/9	32/27
Trichuris infestation			2/2			2/2
Cesophagostomum infestation		36/13				36/13

The denominator shows the number of applications pronounced as having the disease, and the numerator shows the number of animals pronounced as infected by the disease.

Table 10. Result of diagnostic services - Chicken -

Name of disease	1977/'78	'78/'79	'79/'80	'80/'81	'81/'82	Total
Newcastle disease	33/13	95/23	49/18	147/36	97/23	421/113
Fowl pox		3/2	3/3	4/3		10/8
Avian leukosis	2/2	27/13		5/5	2/1	7/6
Marek's disease				10/5	3/1	13/6
Pullorum disease			271/7	45/17	584/57	900/81
Chronic respiratory disease	23/10	195/12	28/10	46/22	398/67	690/121
Infectious coriza	18/10	4/3		1/1	3/1	26/15
Avian infectious bronchitis			2/2	1/1		3/3
Fowl cholera		6/4		3/2	3/1	12/7
Salmonellosis	16/5	40/5				56/10
Coli bacteriosis	35/16	7/3	12/4	9/6	3/2	66/31
Staphylococcosis	18/6	1/1	9/5	10/8	7/5	45/25
Aspergilosis			1/1	19/6	5/2	25/9
Coccidiosis	22/7	38/13	147/34	38/18	30/12	275/84
Leucocytozoonosis				247/14	363/24	610/38
Tapeworm disease			12/4			12/4
Ascariasis	28/11	20/7	33/16	4/4	3/2	88/40
Argas infecstation				1/1	3/3	4/4
Gout				3/2		3/2
Defficiency of Vitamin A				1/1	3/1	4/2
Defficiency of Vitamin E				4/1		4/1
Defficiency of Vitamin K				10/1		10/1
Defficiency of minerals					3/2	3/2

The denominator shows the number of applications pronounced as having the disease, and the numerator shows the number of animals pronounced as infected by the disease.

Table 11. Result of diagnostic services - Dogs, Cats and Monkeys -

Name of disease	Items	1977/'78	'78/'79	'79/'80	'80/'81	'81/'82	Total
(Dogs)							
	No. of applicants	277	345	470	593	550	2,235
Rabies	No. of positives	206	140	361	450	371	1,528
	Positive rate	74.4%	40.6%	76.8%	75.9%	67.5%	68.4%
(Cats)							
	No. of applicants	8	16	23	21	17	85
Rabies	No. of positives	7	2	8	20	5	42
	Positive rate	87.5%	12.5%	34.5%	95.2%	29.4%	49.4%
(Monkeys)							
	No. of applicants	4	2	2	2	9	19
Rabies	No. of positives	1	1	2	1	1	6
	Positive rate	25.0%	50.0%	100.0%	50.0%	11.1%	31.6%

Table 12. Result of diagnostic services - Others -

Name of disease	1977/'78	'78/'79	'79/'80	'80/'81	'81/'82	Total
Coli bacteriosis			8/2	1/1	1/1	10/4
Staphylococcosis		6/1				6/1
Coccidiosis					3/1	3/1
Paramphistomum infestation			1/1			1/1
Ancylostoma infestation				1/1		1/1

The denominator shows the number of applications pronounced as having the disease, and the numerator shows the number of head of animals pronounced as infected by the disease.

Table 13. Number of diseases of major importance occurring by month

Name of disease	The year	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Total
	1977/'78	3/3	7/4	2/2	4/4	7/6	15/11	3/2	4/4	4/4	1/1			50/41
	'78/'79		1/1	7/7	1/1		1/1							10/10
Hemorrhagic septicemia	'79/'80													
in cattle and buffalo	'80/'81													
	'81/'82				1/1									1/1
	Total	3/3	8/5	9/9	6/6	7/6	16/12	3/2	4/4	4/4	1/1			65/52
	1977/'78										1/1	6/3	1/1	8/5
	'78/'79		3/2	4/4					1/1					8/7
Surra - Trypanosomiasis	'79/'80					1/1	1/1	1/1	2/1			1/1		6/5
in cattle and buffalo	'80/'81				3/2				12/6	1/1		1/1	1/1	18/11
	'81/'82	3/3	1/1								2/1		1/1	7/6
	Total	3/3	4/3	4/4	3/2	1/1	1/1	1/1	15/8	1/1	3/2	8/5	3/3	47/34
	1977/'78										1/1			1/1
	'78/'79		2/1	1/1				10/1						13/3
Haemonchiasis in sheep and	'79/'80								2/1					2/1
goats	'80/'81		6/1	6/6				3/1		2/1				17/9
	'81/'82									14/9			7/5	21/14
	Total		8/2	7/7				13/2	2/1	16/10	1/1		7/5	54/28
	1977/'78				2/2		6/3	3/2	5/3		2/2			18/12
	'78/'79	1/1	5/3	5/5	2/2									13/11
Swine pastenurellosis in	'79/'80													
swine	'80/'81	1/1												1/1
	'81/'82						1/1							1/1
	Total	2/2	5/3	5/5	4/4		7/4	3/2	5/3		2/2			33/25

Table 13. Continued.

Name of disease	The year	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Total
Stronglyoidosis in swine	1977/'78									5/2				5/2
	'78/'79		9/3						11/2					20/5
	'79/'80			7/5						3/1				10/6
	'80/'81			5/5	4/2	5/4								14/11
	'81/'82	9/1				1/1	3/2							13/4
	Total	9/1	9/3	12/10	4/2	6/5	3/2		11/2	8/3				62/28
Newcastle disease in chickens	1977/'78	5/1	2/1	1/1	3/1	7/2		1/1	2/2	5/2		1/1	6/1	33/13
	'78/'79			9/4	11/6	4/3			1/1		8/3	60/5	2/1	95/23
	'79/'80	2/1	9/3	1/1	3/3	3/2	5/2		12/3	1/1	1/1	12/1		49/18
	'80/'81	2/2	5/5	7/7	4/3	7/3	88/8	2/1	21/3	3/1	1/1	7/2		147/36
	'81/'82	40/4		6/1	15/2	4/2		12/5	3/2	10/4	5/2	2/1		97/23
	Total	49/8	16/9	24/14	36/15	25/12	93/10	15/7	39/11	19/8	15/7	82/10	8/2	421/113
Coccidiosis in chickens	1977/'78	2/1	2/1		13/2	3/1		1/1				1/1		22/7
	'78/'79			2/1	4/1	12/2	3/1			1/1			16/7	38/3
	'79/'80	2/1	9/3	13/3	6/4	3/2	4/4	83/5	6/2	9/3	4/4	7/2	1/1	147/34
	'80/'81	2/2	1/1	4/4	1/1	1/1	5/2	4/2	8/1	2/1	3/1	1/1	6/1	38/18
	'81/'82	5/1	3/1	2/1		4/2		4/2		3/1	6/2	3/2		30/12
	Total	11/5	15/6	21/9	24/8	23/8	12/7	92/10	14/3	15/6	13/7	12/6	23/9	275/84
Rabies in dogs	1977/'78	5/5	16/16	5/5	8/8	14/14	20/20	23/23	32/32	22/22	18/18	24/24	19/19	206/206
	'78/'79	6/6	7/7	2/2	8/8	8/8	16/16	15/15	15/15	8/8	18/18	14/14	23/23	140/140
	'89/'80	21/12	24/24	26/26	28/28	22/22	34/34	33/33	23/23	25/25	46/46	45/45	34/34	361/361
	'80/'81	28/28	40/40	35/35	51/51	34/34	28/28	41/41	35/35	37/37	39/39	42/42	40/40	450/450
	'81/'82	48/48	20/20	34/34	26/26	33/33	35/35	37/37	23/23	32/32	21/21	24/24	38/38	371/371
	Total	108/108	107/107	102/102	121/121	111/111	133/133	149/149	128/128	124/124	142/142	149/149	154/154	1,528/1,528

Table 14. Techniques for animal disease investigation

1. Basic techniques

   1) Washing and sterilization of glassware and equipment (new and, used)
   2) General disinfection and sterilization (contaminated equipment, animals, animal sheds etc.)
   3) Directions of equipment and machines in common use (dry heaters, autoclaves, incubators, centrifuges, direct reading balances)
   4) Handling of optical microscopes and microscopic photographing techniques
   5) Handling of fluorescent microscopes and basic techniques of FAT
   6) Making protocol for diagnosis and the point in recording
   7) Collection of specimens submitted to diagnostic services, their methods of preservation and transportation
   8) Restraining techniques for large, medium and small animals, techniques of injection and collection of blood
   9) Raising of experimental animals (particulaly mice), and directions for propagation

2. Technical guidance in bacteriological section

   1) Preparation of regular disinfectants, reagents, and staining solution
   2) Preparation of regular media and directions
   3) Regular and special differential stain methods
   4) Culture methods for various bacteria (aerobic, anerobic, and CO_2 culture)
   5) *Counting method of number of bacteria*
   6) Methods of mateiral inoculation on various media
   7) Plate rapid agglutination test for various diseases (pullorum disease etc.)
   8) Test-tube agglutination test for various diseases (brucellosis, AR etc.)
   9) Vaginal mucos agglutination test (vibrio fetus, Campylobacter fetus)
   10) Complement fixation test (CFT), (brucellosis)
   11) Ascoli test
   12) Directions for gas pack system
   13) Directions for minitek system and biotest
   14) Drug susceptibility test
   15) Differential test of sero - type

Table 14. Continued.

16) Preparation of "Sugar media" and sugar breakdown test
17) Method of detection of antibodies in yolks (ND, pullorum disease, CRD)
18) Method of isolating and identifying of Pseudomonas
19) Method of isolating Mycoplasma sp. (M.g)
20) Method of isolating and identifying Haemophilus gallinarum
21) Differentiation of Glostridium septicum and Clostridium chauvoei
22) Method of isolating and identifying Nocardia asteroides
23) Treatment method of specimens submitted to tuberculosis diagnosis and inoculation techniques
24) Method of isolating and identifying Mycobacterium sp. responsible for tuberculosis
25) Method of culturing and identifying Aspergius

3. Technical guidance in biochemistry section

1) Measuring of hematocrit value and hemoglobin
2) Measuring of serum protein, A/G ratio, Quantitative analysis of Ca, Mg, IP (Inorganic Phosphorus) in serum and BUN
3) Quantitative analysis of blood sugar
4) Serum protein fraction by electrophoresis
5) Preparation of rabbit's anti-globurin serum
6) Liver function test
7) Quantitative analysis of various serum compositions by a blood analyzer

4. Technical guidance in virus section

How to use aseptic room
Aseptic techniques
Sterility test
Preparation of media (MEM, LE, 199, etc.)
Preparation of solutions (2.9%TPB, PBS, 7.5%$NaHCO_3$, 1%Trypsin, etc.)
Preparation of antibiotic solution (K.P.S)
Preparation of anti-fungous solution (Fungizon)
Sterilization procedures with membrane filters
Sterilization procedures of viral instruments and organs
Cell cutlure techniques of established cell lines (Hmlu, MDBK, SK) and preservation of cells with dimethylsulfoxide

Table 14. Continued.

Primary tissue cultures (CEF, CK, SK, ST, etc.)
Passage of viruses with cell cultures (IBR, BEF, JE-virus, etc.)
Pasage of viruses with embryonic eggs (ND, IB-virus, etc.)
Hemagglutination and hemagglutination-inhibition tests (Microplate and tray methods ND, JE-virus, etc.)
Titration of viruses by cell culture techniques ($TCID_{50}$)
Titration of viruses by the method of embryonic egg inoculation (EID_{50})
Serum neutralization by cell culture technique and egg inoculation methods
Fluorescent antibody techniques (FAT) to detect viral antigen

1) Cryostat method (MD, HC, Toxoplasma, etc.)
2) Stamp method (IBR, Rabies, ND, etc.)
3) Cover slip cell culture method (IBR, BEF, ND, IB, etc.)

Inactivation of virus with formalin
Production of NDV-HA antigen
Lyophilization of viruses (MDV, IBRV, BEFV, etc.)
General methods for virus isolation from field specimens

1) Method of preparing emulsions from field specimens
2) Methods of inoculating and harvesting with embryonic eggs
3) Methods of inoculation to cell culture systems
4) Methods of inoculation to experimental animals

Physicochemical methods for characterization of viruses

1) Nucleic acid determination
2) Ultrafiltration for estimating virus particle size
3) Ether-sensitivity test
4) Acid pH-stability test
5) Heat-sensitivity test

Virological methods for diagnosis of rabies

1) FAT
2) Mouse inoculation with intracerebral route
3) Dog inoculation

5. Transport of some parasitic techniques

1) Examining method for parasitic eggs in animal feces

(1) How to collect examined materials and send to DIC

Table 14. Continued.

(2) Method of examination of eggs of Trematoda, especially testing method of liver fluke by Watanabe's method
(3) Method of examination of eggs of Cestoda and Nematoda
(4) Direct smear method of animal faces
(5) Collecting method by sedimentation of parasitic eggs
(6) Floating method of parasitic eggs
(7) Counting method on EPG (eggs per gram) and OPG (oocysts per gram)

2) Culture method of parasitic eggs

(1) Filter paper method
(2) Tile method

3) How to collect and store Nematoda in gastrointestine
4) How to identify endoparasites
5) Method of examination of microfilaria in blood by aceton concentration method
6) Counting method by micrometer for size of egg, larva and microfilaria etc.
7) How to examine Protozoa

(1) Morphological observation of Protozoa
(2) Serological diagnosis of Toxoplasma
(3) Pathological finding of chick intestine by Coccidia
(4) Examination of Leucocytozoon and Trypanosoma in blood

8) How to examine Arthropoda (Acarina and Insecta)

(1) Field collection of Arthropoda
(2) How to send and store samples
(3) Identification of Acarina and Insecta
(4) Drawing method of Acarina and Insecta for identification

9) How to use light trap for collection of biting midge and mosquito
10) Collecting method of several stages in Hypobosca
11) How to examine Scabies and Demodex in the skin
12) How to control noxious Acarina and Insecta of livestock

Table 15. Bacteria isolated in the bacteriology section during 1977 and 1978

Isolated bacteria	Animal Code									
	C	B	G	S	P	Ch	D	H	OA	OS
Escherichia coli					+	+			+*	
Salmonella sp.						+				
Pasteurella sp.	+	+	+		+	+				
Staphylococcus sp.						+				
Corynebacterium sp.				(+)						

Animal code: C: cattle; B: buffalo; G: goats; S: pigs; Ch: chickens; D: ducks; H: horses; OA: other animals; OS: other specimens; *; elephants;
+: isolation of the organism, (+): first isolation in the laboratory, original of the present D.I.C., Medan

Table 16. Bacteria isolated in the bacteriology section during 1979

	Isolated bacteria	Animal Code C	B	G	S	P	Ch	D	H	OA	OS
Gram -	Escherichia coli			+		+	+	+		+*	
	E. coli (OK:I, O 86a;K 61)					(+)					
	E. coli (OK:II, O 146;K 89)		(+)				(+)				
	E. coli (OK:I, O 26;K 60)		(+)			(+)					
	E. coli (OK:II, O 55;K 59)	(+)				(+)					
	E. coli (OK:I, O 127a;K 63)		(+)			(+)					
	E. coli (OK:II, O 119;K 69)		(+)			(+)					
	E. coli (OK:III, O 44;K 74)	(+)				(+)					
	E. coli (OK:III, O 28;K 73)					(+)					
	E. coli (OK:II, O 111;K 58)					(+)					
	E. coli (OK:I, O 136;K 78)					(+)					
	Salmonella gallinarum						(+)				
	Salmonella sp. (O; B(4,5))					(+)					
	Salmonella cholerae-suis									(+)**	
	Shigella dysenteriae	(+)									
	Shigella sp.							(+)			
	Klebsiella sp.		(+)			(+)					
	Klebsiella pneumoniae					(+)					
	Proteus sp.					+	+				
	Paeudomonas sp.						(+)				
	Chromobacterium violacem			(+)			(+)				
	Flavobacterium, Pickett's group III		(+)								
	Neisseria sp.		(+)			(+)	(+)				
	Neisseria caterhalis		(+)			(+)					
	Neisseria flavarens		(+)								
	Actionobacter anitratus		(+)								
	Streptobacillus sp.		(+)								
Gram +	*Staphylococcus sp.*		+				+				
	Staphylococcus aureun		(+)								
	Streptococous sp.		+			+					
	Streptococcus haemolyticus		(+)								
	Lactobacillus sp.					(+)					

Animal code: C; Cattle, B; buffalo, G; goats, S; sheep, P; pigs, Ch; chickens, D; ducks, H; horses, OA; other animals, OS; other specimens, *: cats, elephants, **: pigs for feed, *: isolation of organism, (+): first isolation at D.I.C., Medan.

Table 17. Bacteria isolated in the bacteriology section during 1980

Isolated bacteria	Animal Code C	E	G	S	P	Ch	D	H	OA	OS
Escherichia coli		+		+	+	+			+*	
E. coli (OK:I, O 136;K 78)					+					
E. coli (OK:III, O 44;K 74)					+					
E. coli (OK:I, O 26a;K 61)						(+)				
E. coli (AD group)					(+)	(+)		(+)		
Salmonella cholerae-suis					+					
Shigella sp.					+					
Proteus sp.	+	+		+	+	+				
Proteus morgani		(+)								
Klebsiella sp.					+					
Enterobacter sp.						+				
Citrobacter sp.	+									
Pasteurella multocida		+				+				
Pasteurella hemolytica					(+)					
Plesiomonas sp.					(+)	(+)				
Necromonas sp.	(+)									
Chromobacterium sp.	(+)	(+)								
Pseudomonas sp.	(+)					+				
Neigaeria caterhalis	+									
Neisseria elongata						(+)				
Acinetobacter anitratus	+	+			+	+				
Erysipelothrix rhusiopathiae					(+)					
Staphylococcus sp.	+	+			+	+				
Clostridium septicum		(+)								
Nocardia asterioides				(+)						
Corynebacterium pyogenes		(+)								
Lactobacillus subgenus atreptobacterium	(+)									
FUNGI										
Aspergillus sp.					(+)	(+)				(+)**
Mucor sp.										(+)**

Animal code: C; Cattle, B; buffalo, G; goats, S; sheep, P; pigs, Ch; chickens, D; ducks, H; horses, OA; other animals, OS; other specimens, *: rabbits, **: pig feed, +: isolation of organism, (+): first isolation at D.I.C., Medan.

Table 18. Bacteria isolated in the bacteriology section during 1981

Isolated bacteria	Animal Code									
	C	B	G	S	P	Ch	D	H	OA	OS
Escherichia coli	+	+			+	+				
E. coli (AD group)						+			+*	
E. coli (OK:III, O 143;K X1)						(+)				
E. coli (OK:III, O 125;K 70)					(+)					
Salmonella typhi (O;D(9))		(+)								
Salmonella arizona	(+)									
Klebsiella sp.		+			+					
Klebsiella pneumoniae	+					+				
Klebsiella rhinoacleromatis	(+)									
Klebsiella edwardsii						(+)				
Proteus sp.	+	+				+				
Enterobacter sp.			+							
Yersinia sp.			(+)							
Yersinis enterocolitica					(+)					
Citrobacter sp.		+								
Citrobacter koseri			(+)							
Shigella flexneri							+			
Pasteurella sp.					+				+**	
Pasteurella multocida	+	+				+				
Pasteurella hemolytica	+		+							
Pasteurella urene			(+)							
Pseudomonas sp.	+	+			+	+				
Neisseria sp.			+							
Neisseria caviae		(+)								
Neisseria caterhalis	+	+								
Neisseria meningitidis	(+)									
Neisseria pharyngis	(+)	(+)								
Acinetobacter anitratus	+				+	+				
Chromobacterium sp.	+				+	+				
Flavobacterium menigosepticum	(+)	(+)								
Cardiobacterium hominis						(+)				

Animal code: C; cattle, B; buffalo, G; goats, S; sheep, P; pigs, Ch; chickens, D; ducks, H; horses, OA; other animals, OS; other specimens, *: rabbits, **: guinea pigs, +: isolation of organism, (+): first isolation at D.I.C., Medan.

Table 18. Continued.

Isolated bacteria	Animal Code C	B	G	S	P	Ch	O	H	OA	OS
Staphylococcus sp.	+	+			+	+				
Staphylococcus aureus	+	+	+			+				
Streptococcus sp.			+							
Streptococcus uberis			(+)							
Nocardia asteroides					+					
Mycobacterium avium					(+)					
Corynebacterium ovis		(+)								
Corynebacterium bovis			(+)							
Corynebacterium sp.			+							
Propionibacterium acnes	(+)									
Bacillus alvei	(+)									
Bacillus subtilis					(+)					
Bacillus coagulans	(+)									
Lactobacillus sp.		+								
Streptobacillus moniliformis			(+)							
Mycoplasma sp.					(+)					
Fungi										
Aspergillus sp.					+					
Trichophyton sp.	(+)									

Animal code: C; cattle, B; buffalo, G; goats, S; sheep, P; pigs, Ch; chickens, D; ducks, H; horse, OA; other animals, OS; other specimens, *: rabbit; **: guinea pigs, +: isolation of organism, (+): first isolation at D.I.C., Medan.

Table 19. Viruses isolated from 1979 to 1981

Virus	Animal	Year	Isolation	Identification
Newcastle disease	Chickens	1979	Embryonic egg inoculation	FAT, HA(1)
Rabies	Dogs	1979	Mouse intercerebral inoculation	FAT
Infectious bovine rhinotracheitis	Buffalo	1981	Tissue culture (MDBK strain cell)	CPE, A type intranuclear inclusion, FAT

(1): hemagglutination

Table 20. Identified parasites at parasitology

Classification	Name of parasite	Host	Identified year
Protozoa	Trypanosoma evansi	horses, cattle, buffalo	1977
	Eimeria tenella	chickens	1977
	E. debliecki	swine	"
	E. spp.	cattle, buffalo goats	"
	Leucocytozoon caulleryi	chickens	1980
	Babesia bigemina	cattle, baffalo	1980
	Theileria sp.	cattle	1981
	Anaplasma centrale	cattle, buffalo	1977
	A. marginale	" "	1980
	Toxoplasma gondii	swine	1978
	Balantidium coli	cattle	1977
Platyhelminthes	Paramphistomum spp.	cattle, buffalo	1978
	Fasciola hepatica	cattle, buffalo	1977
	Schistosoma sp.	cattle	1979
	Paragonimus sp.	cattle, buffalo	1979
Nemathelminthes	Trichuris suis	swine	1979
	T. spp.	cattle	"
	Strongyloides ransomi	swine	1979
	S. papillosus	cattle, buffalo, sheep, goat	"
	Ascaris suum	swine	1977
	Neoascaris vitulorum	cattle, buffalo	"
	Toxocara canis	dogs	"
	Ascaridia galli	chicken	"
	Poteriostomum spp.	horses	1978
	Oesophagostomum	cattle, buffalo	1978
	radiatum O. spp.	sheep, goats	"
	Ancylostoma spp.	dogs	1979
	Bunostomum phlebotomum	cattle, buffalo	1977
	B. trgonocephalum	goats	"
	Globocepharus urosubulatus	swine	"
	Trichostrongylus spp.	cattle, buffalo	1978
	Haemonchus contortus	cattle, buffal0, shocp, goats	1977
	Mccistocirrus digitatus	cattle, buffalo	"

Table 20. Continued.

Classification	Name of parasite	Host	Identified year
	Ostertagia ostertagi	cattle, buffalo	1979
	Cooperia punctata	cattle, buffalo	1977
	Nematodirus spp.	cattle, buffalo	1979
	Setaria digitata	cattle	1978
	S. spp.	buffalo	1978
Arthropoda	Roophilus microplus	cattle, buffalo	1981
	Rhipicephalus sp.	cattle	"
	Argas robertsi	chickens	1981
	Demodex caprae	goats	1981
	Sarcoptes scabiei	buffalo, sheep, coat, swine	1978
	Haematopinus curysternus	cattle	1981
	H. suis	swine	"
	Culicoides arakawae	chickens	1982
	C. spp.	"	
	Tabanus megalops	cattle, buffalo	1981
	T. rubidens	" "	"
	T. optatus	" "	"
	T. ceylonieus	" "	"
	T. sp.	" "	"
	Stomoxys calcitrans	cattle, buffalo	1981
	Haematobia irritans	cattle, buffalo	"
	Hypobosca maculata	cattle, horse	1980

Figure 1. Percentage of respective applications of various animals submitted to diagnostic services over the five years

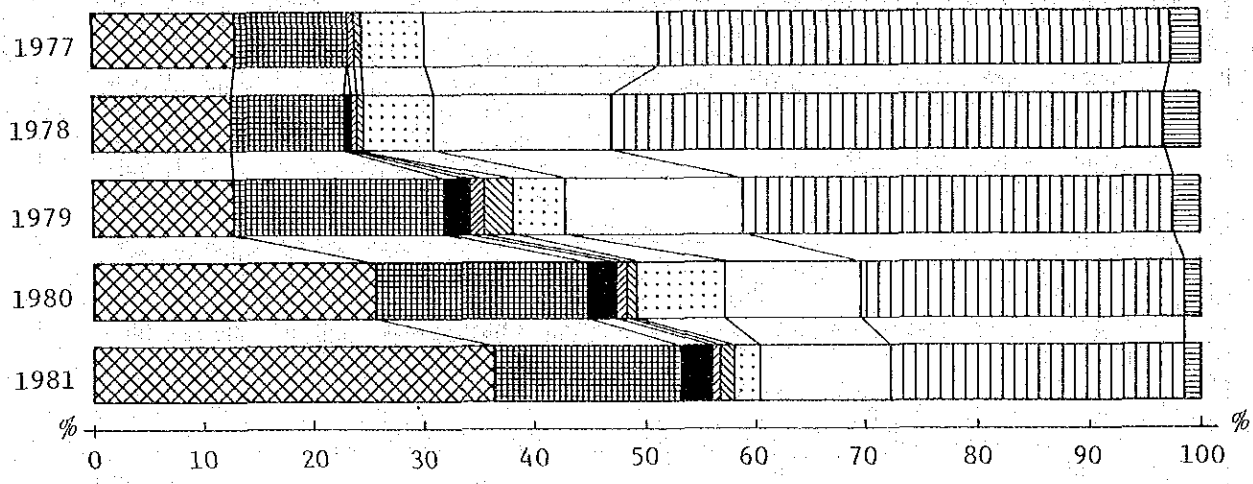


Figure 2. Percentage of respective head of various animals submitted to diagnostic services over the five years

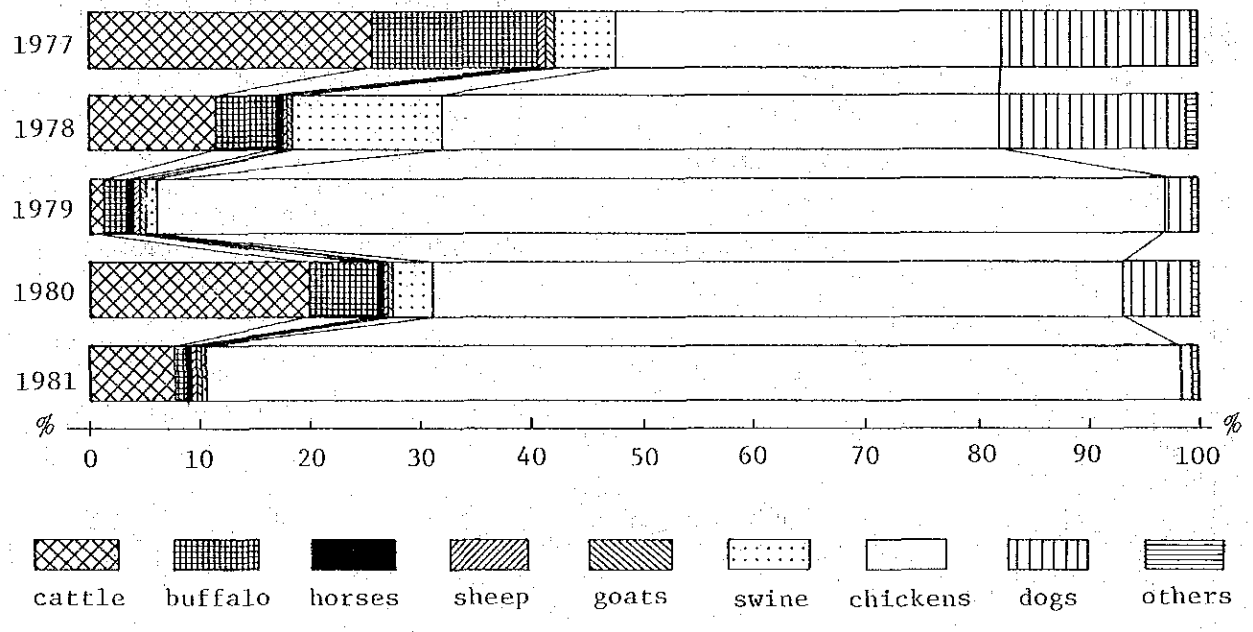


Figure 3. Applications and animals submitted to diagnostic services over the five years

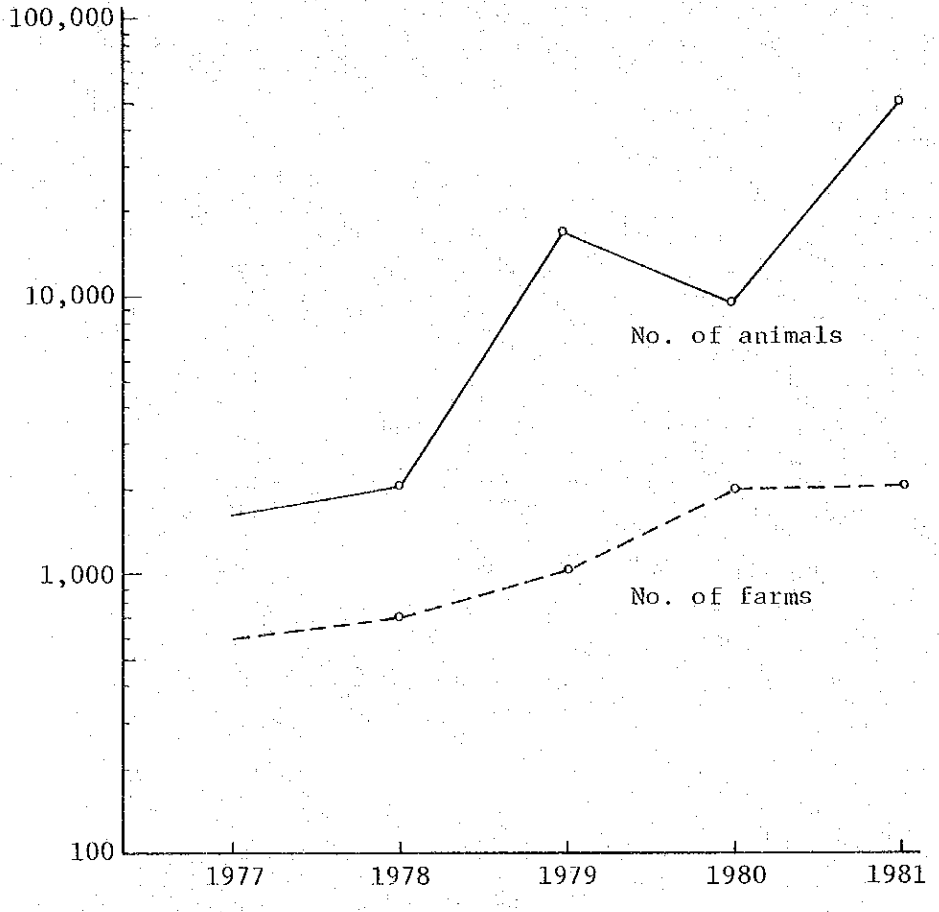


Figure 4. Percentage of kinds of animals and specimens submitted to diagnostic services

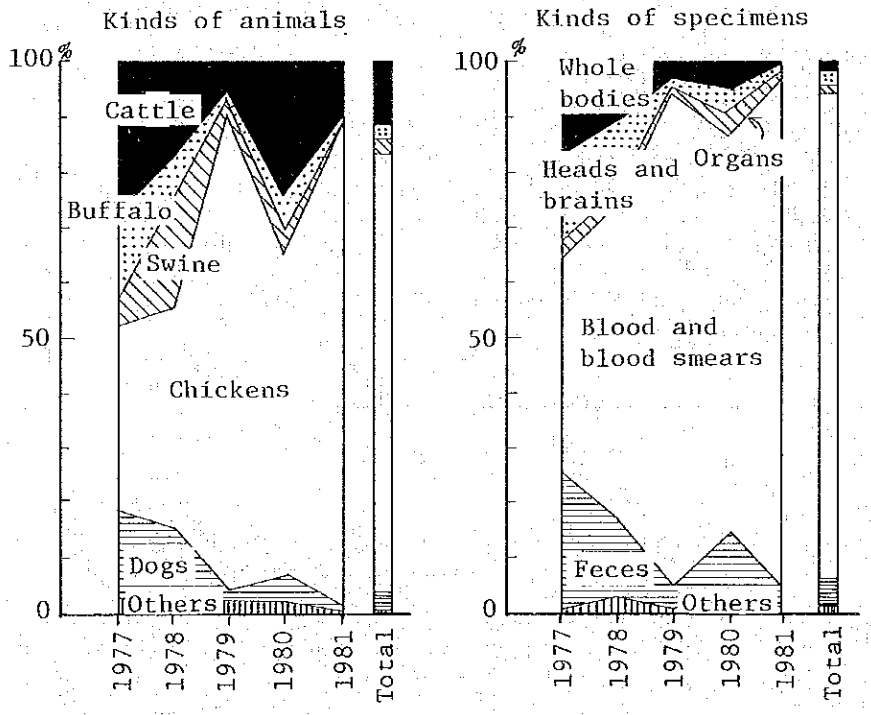
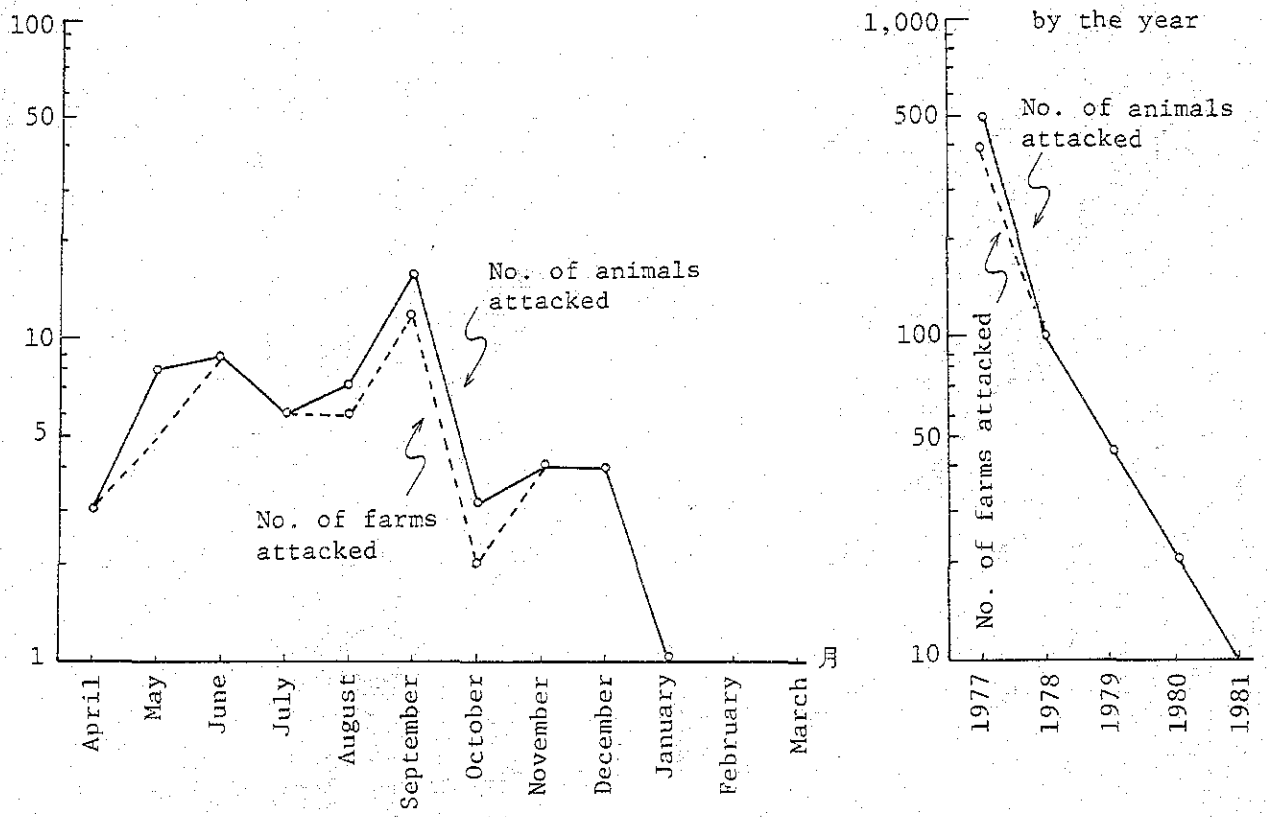


Figure 5. Monthly occurrence of Hemorrhagic septicemia over the five years



: area where hemorrhagic septicemia of cattle and buffalo occurred and where the causative organism (Pasteurella multocida) was isolated during 1981.

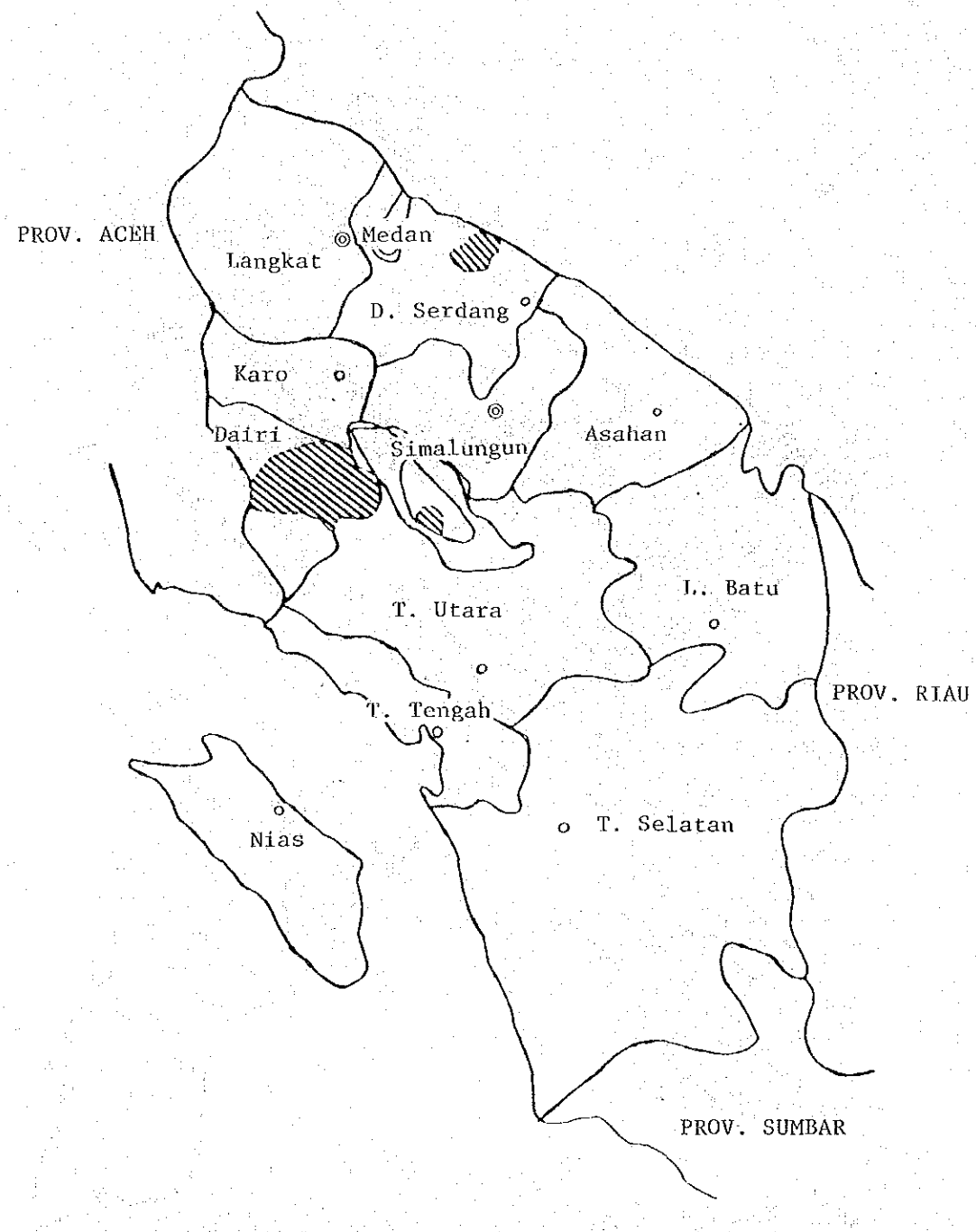


Figure 6. The distribution of hemorrhagic septicemia in cattle and buffalo in the province of North Sumatra during 1981

Many cases in domestic animals were reported during 1977 and 1978, but since they had not rotted it is uncertain whether the causative organism was Pasteurella multocida or not.

: area where hemorrhagic septicemia of cattle and buffalo occurred and the causative organism (Pasteurella multocida) was isolated up to 1982

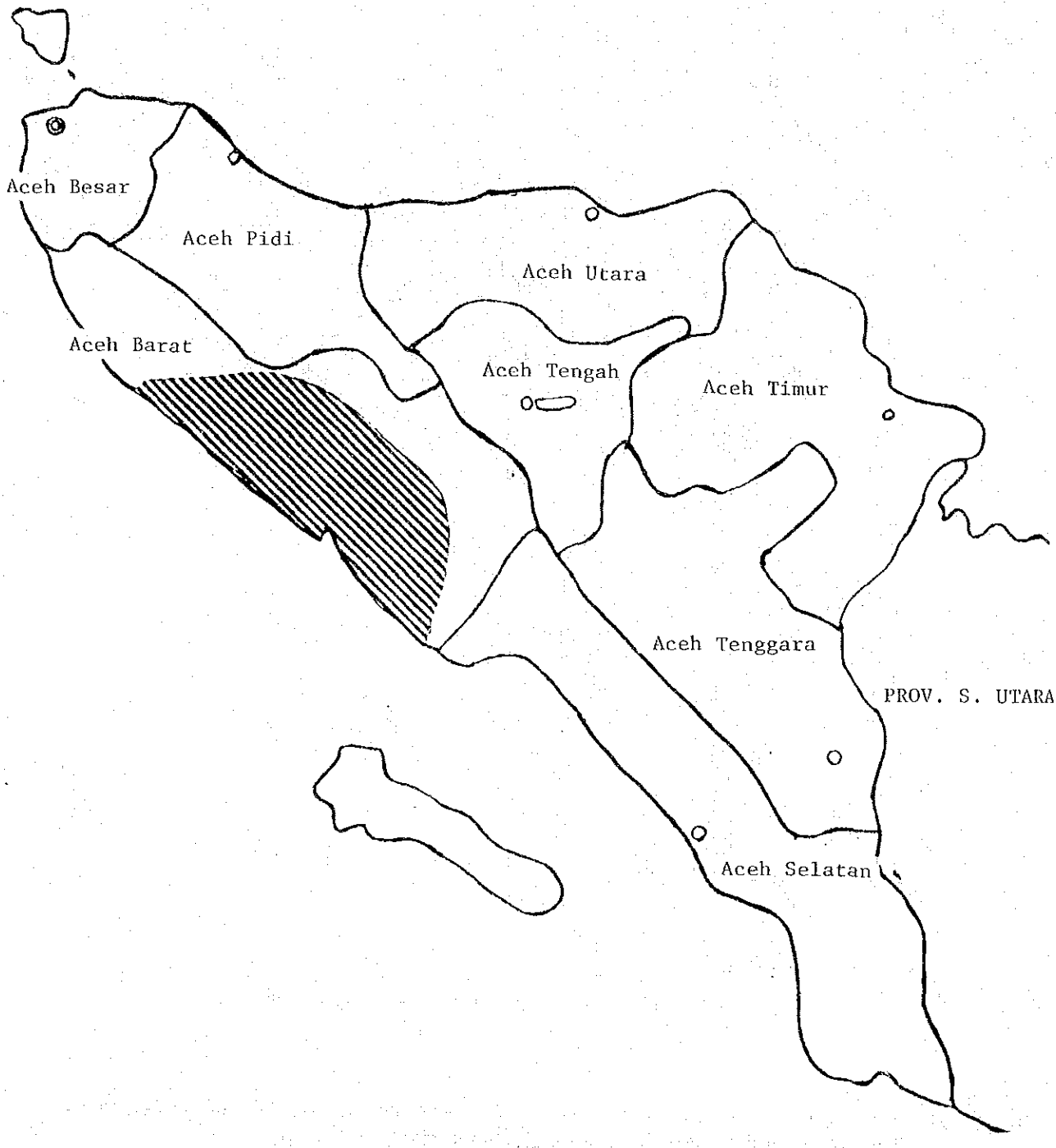


Figure 7. The distribution of hemorrhagic septicemia of cattle and buffalo in the province of Aceh up to 1982

In the province of Aceh, the outbreak of the disease in 1977 gave the biggest economic harm in the recent history of both areas.

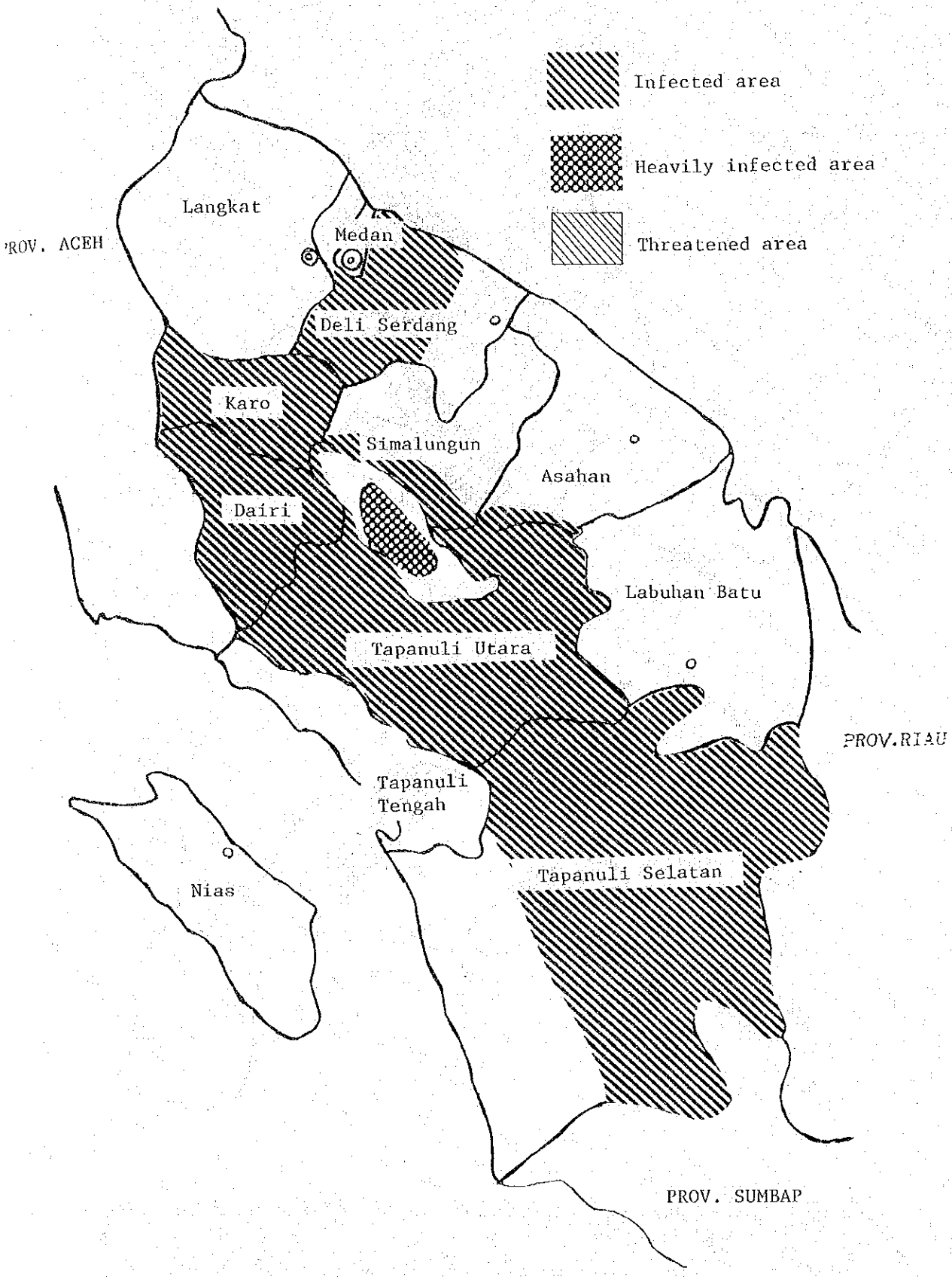


Figure 8. The occurrence distribution of surra over the five years (North Sumatra Province)

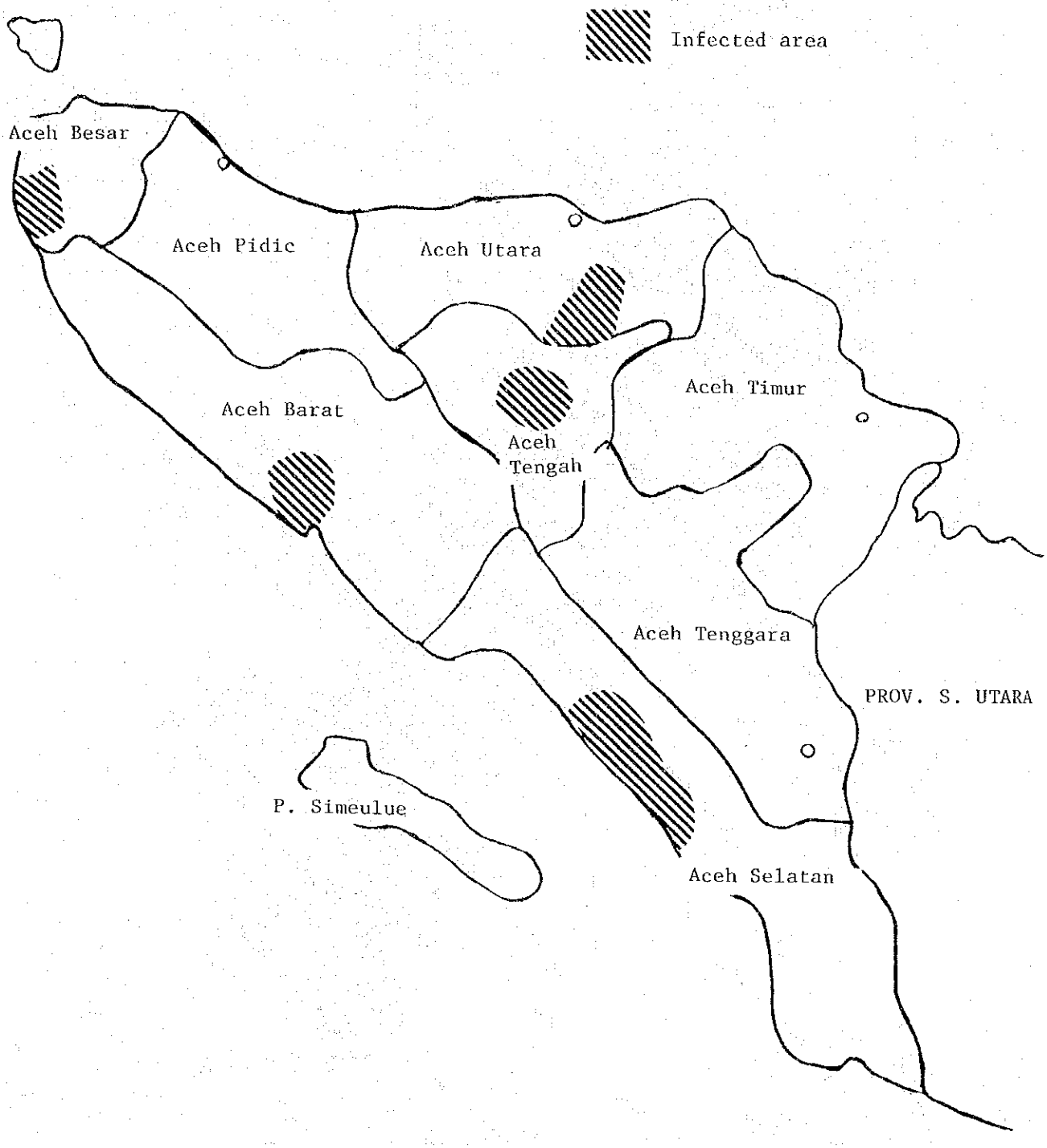


Figure 9. The occurrence distribution of surra over the five years (Aceh Province)

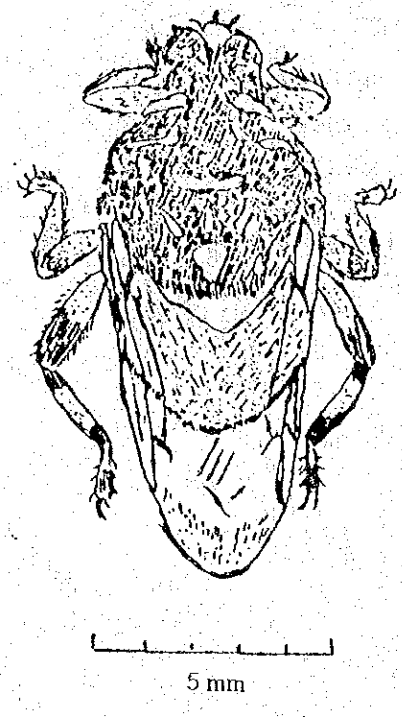


Figure 10. Adult Hippobosca maculata
(by J. Araki)

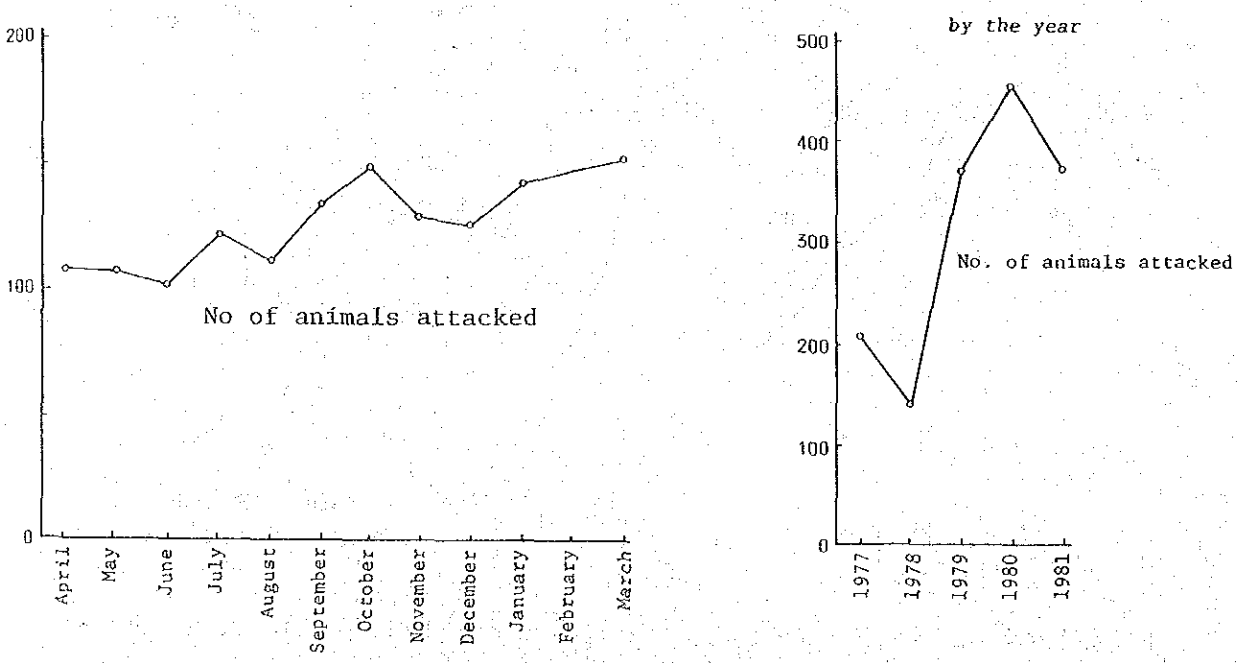


Figure 11. Monthly occurrence of rabies over the five years

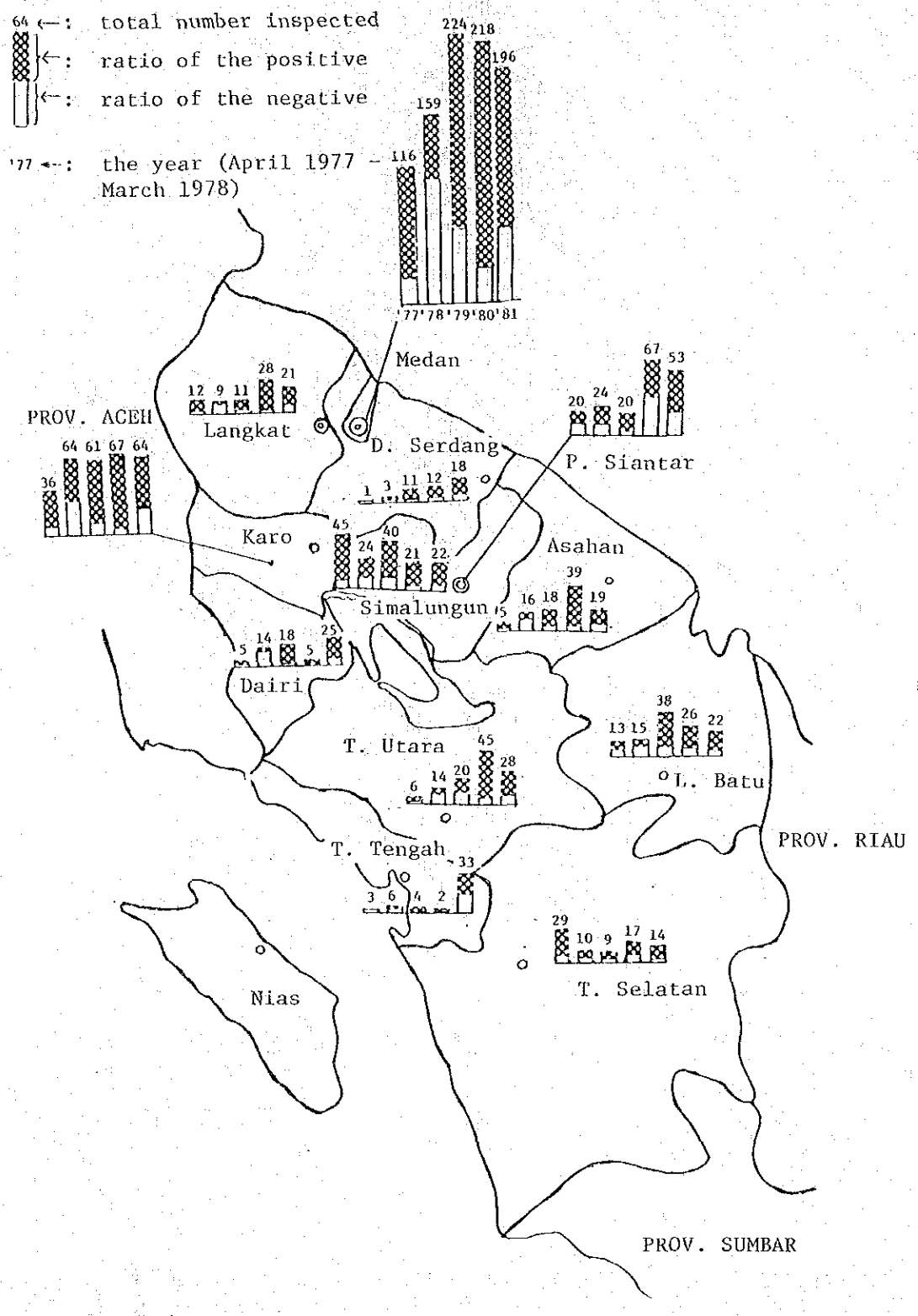


Figure 12. The occurrence and distribution of rabies in the province of North Sumatra from 1977 - 1981

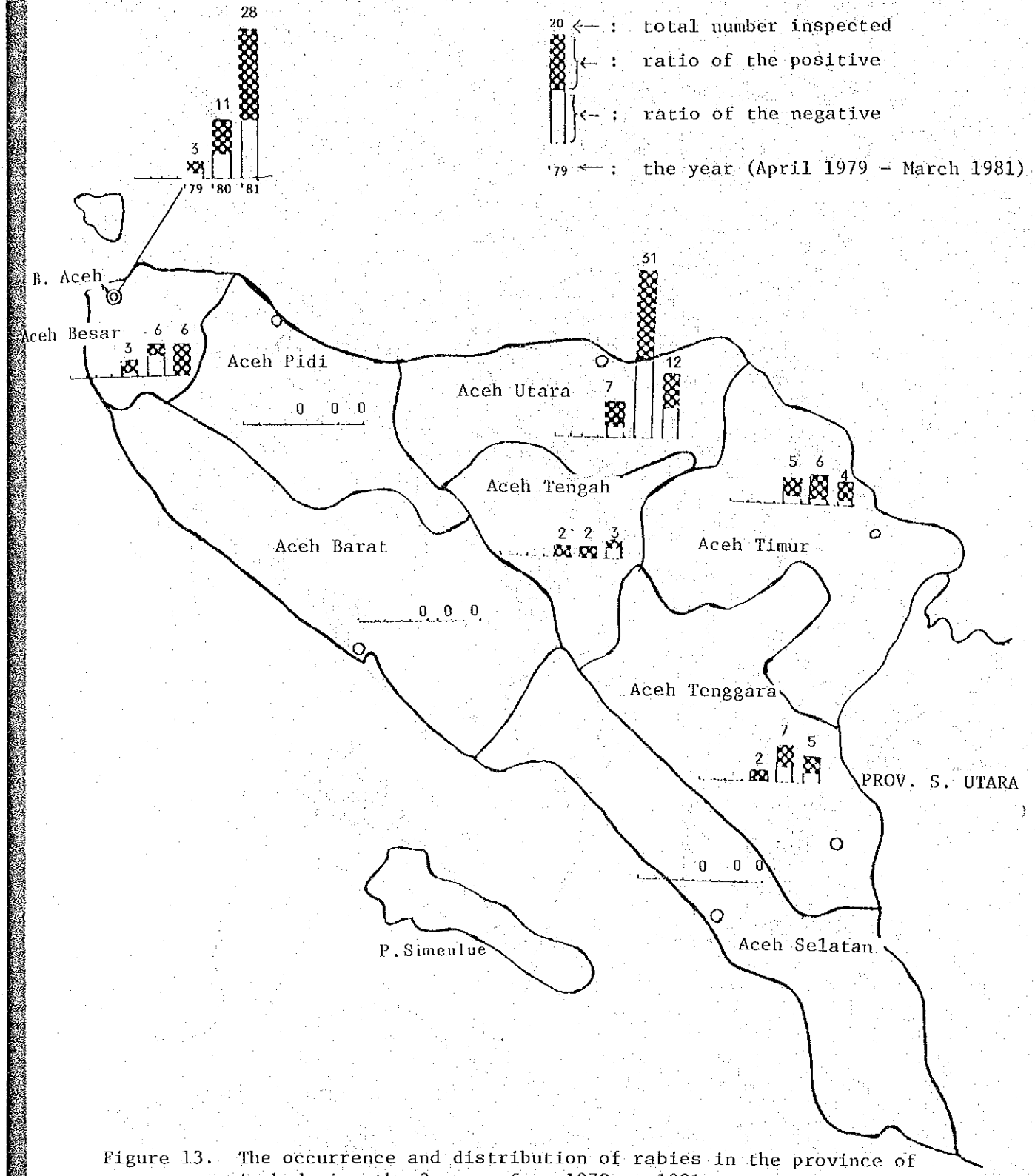


Figure 13. The occurrence and distribution of rabies in the province of Aceh during the 3 years from 1979 to 1981

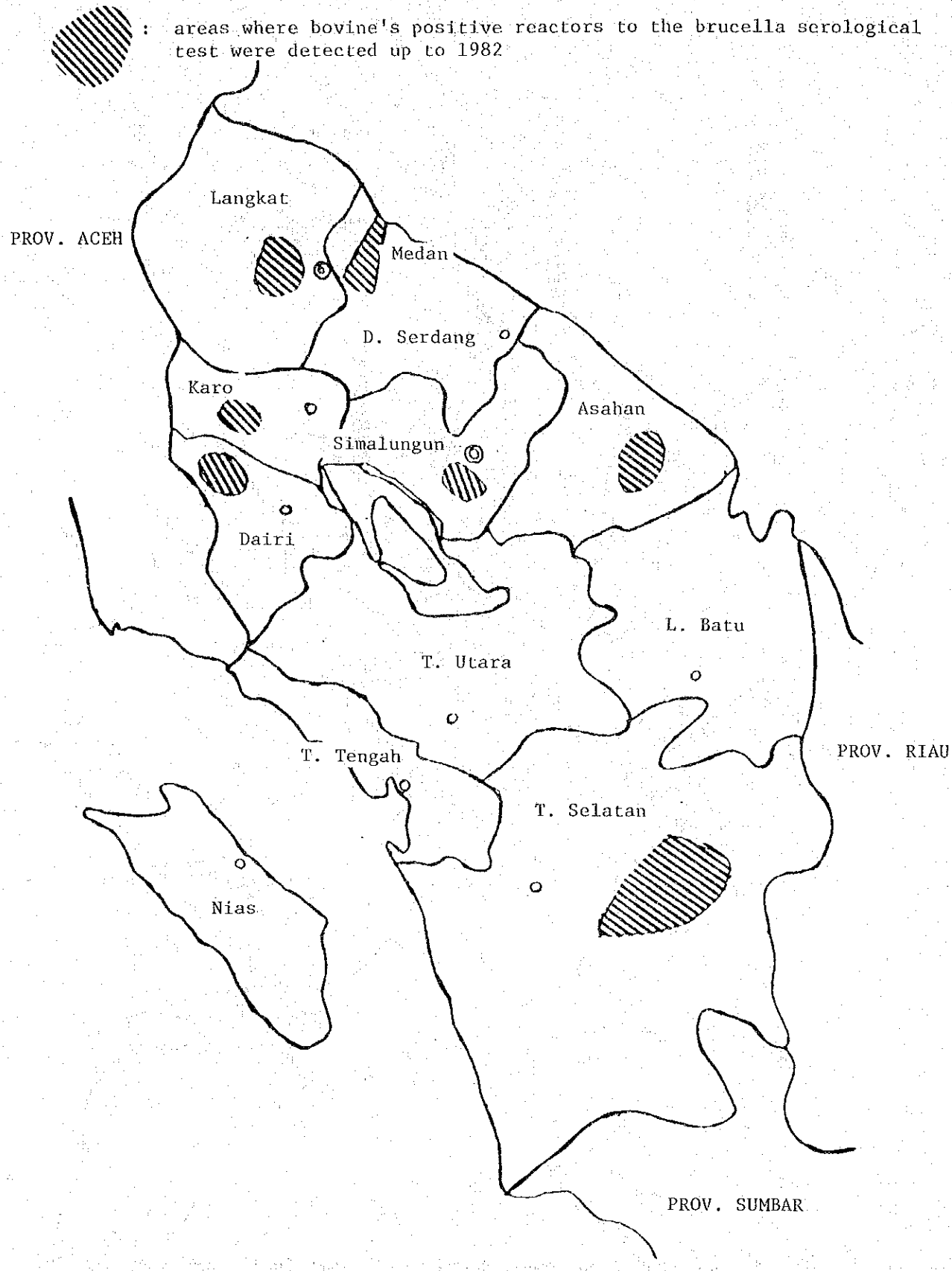


Figure 14. The distribution of bovine's positive reactors to the brucella serological test up to 1982 (North Sumatra Province)

: areas where bovine's positive reactors to the brucella serological test were detected up to 1982

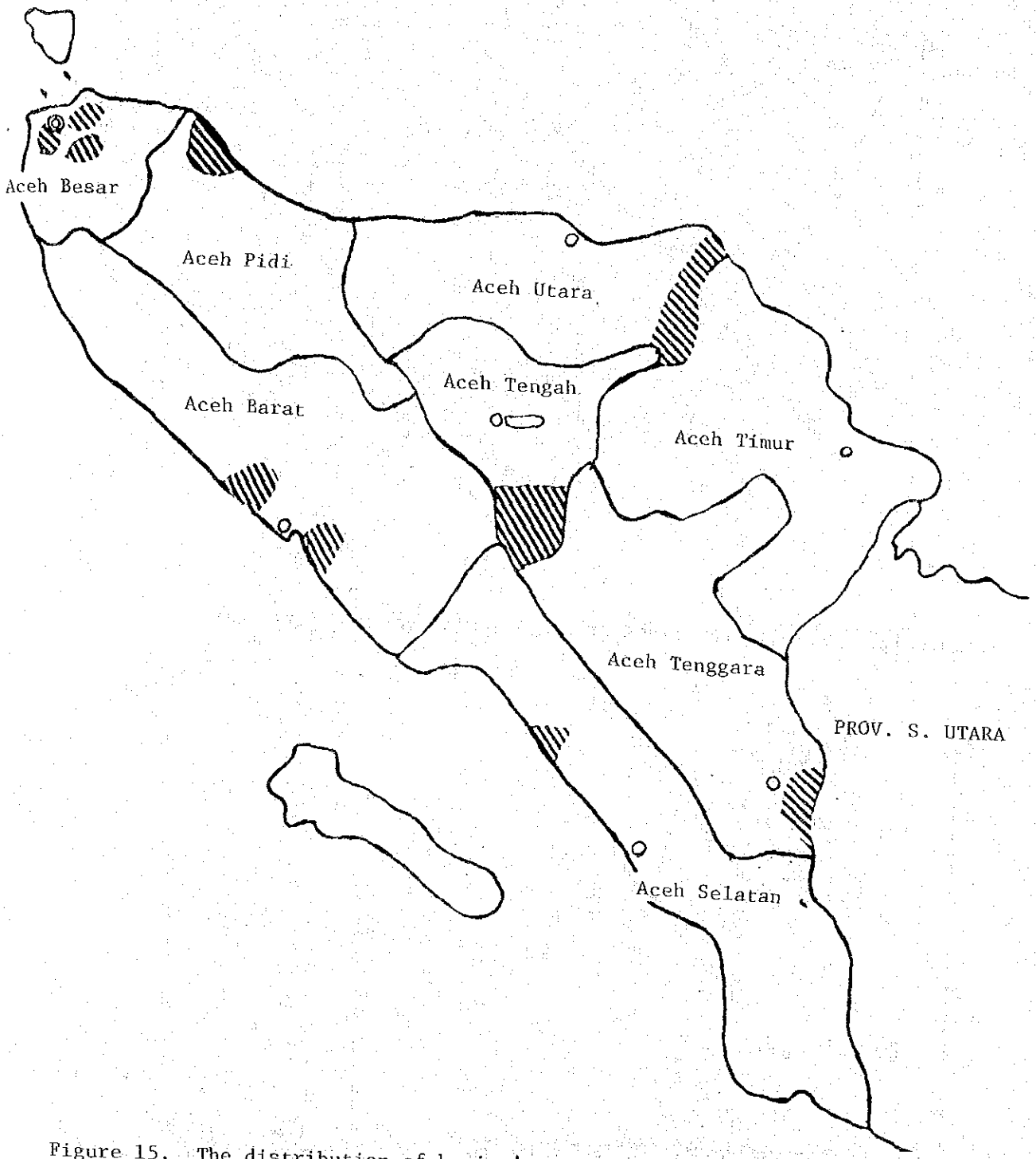


Figure 15. The distribution of bovine's positive reactors to brucella serological test up to 1982 (Aceh Province)

Figure 16. Monthly occurrence of Newcastle's disease over the five years

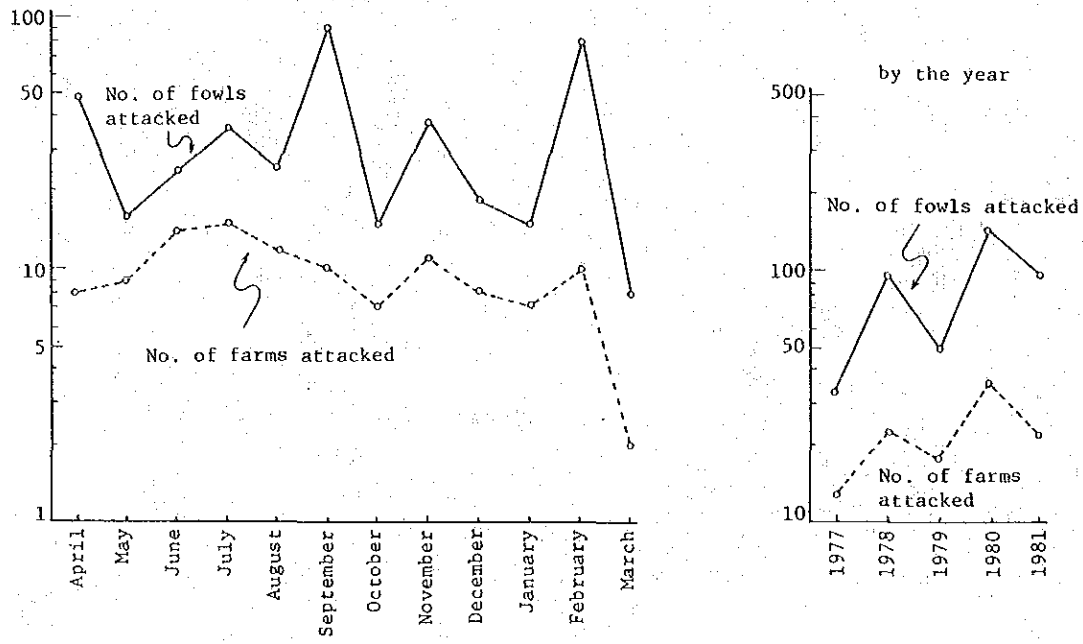


Figure 17. Monthly occurrence of coccidiosis over the five years

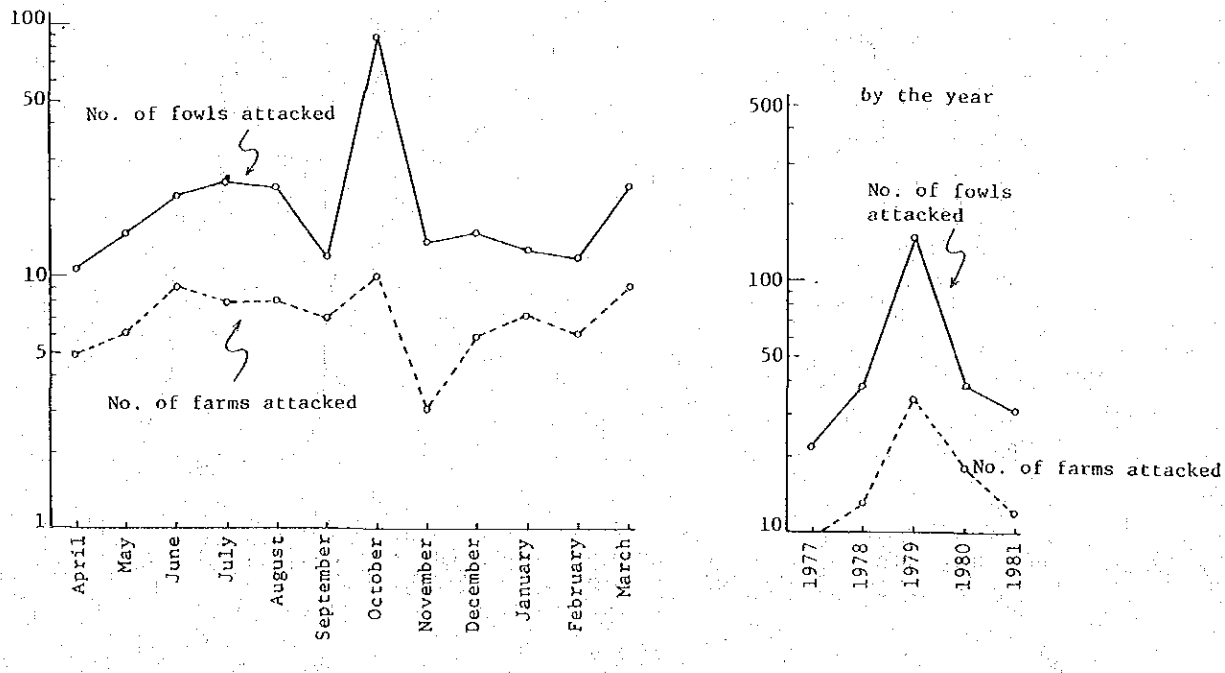


Figure 18. Examination Chart in the Bacteriology Section

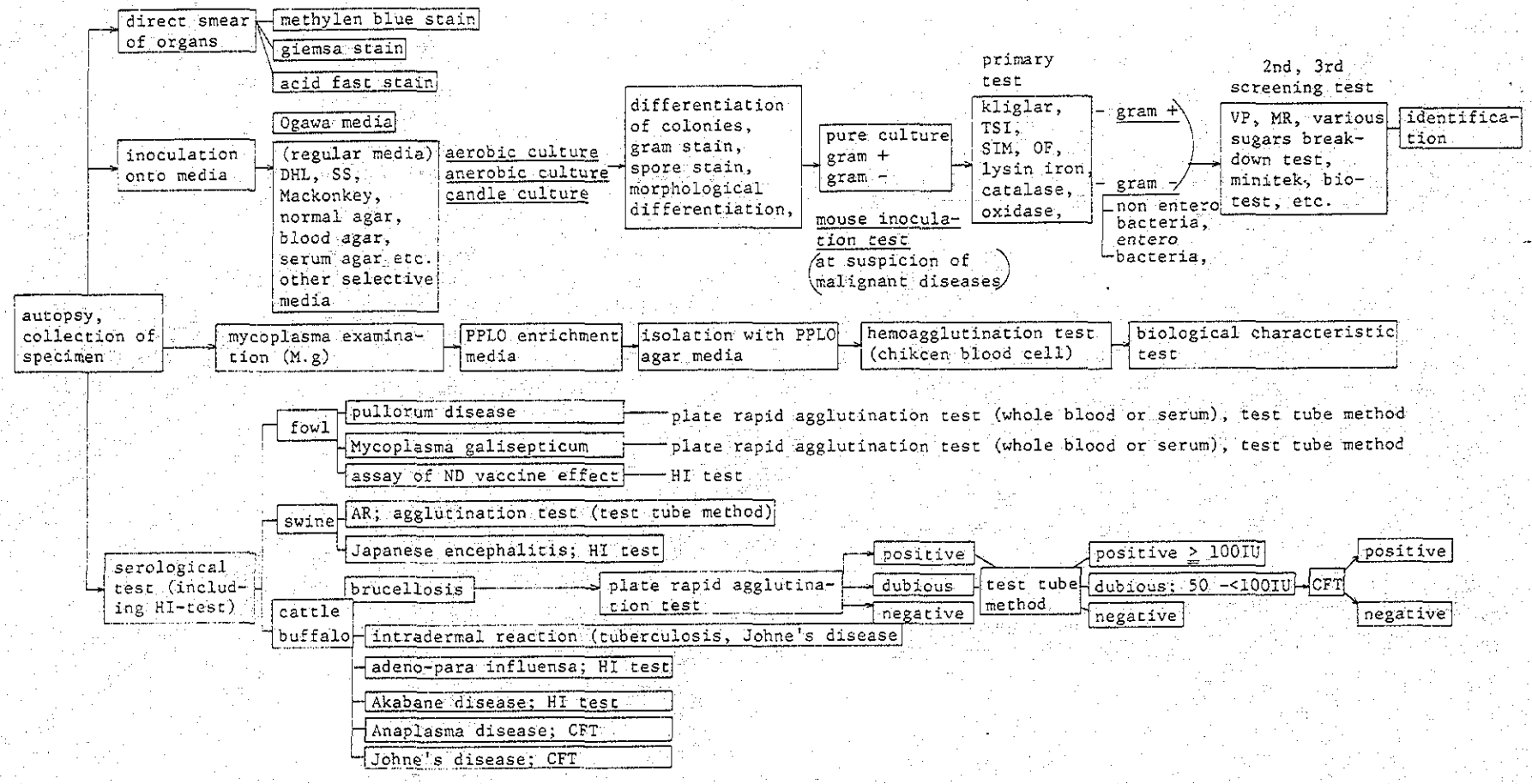


Figure 19. Examination Chart in the Virology Section

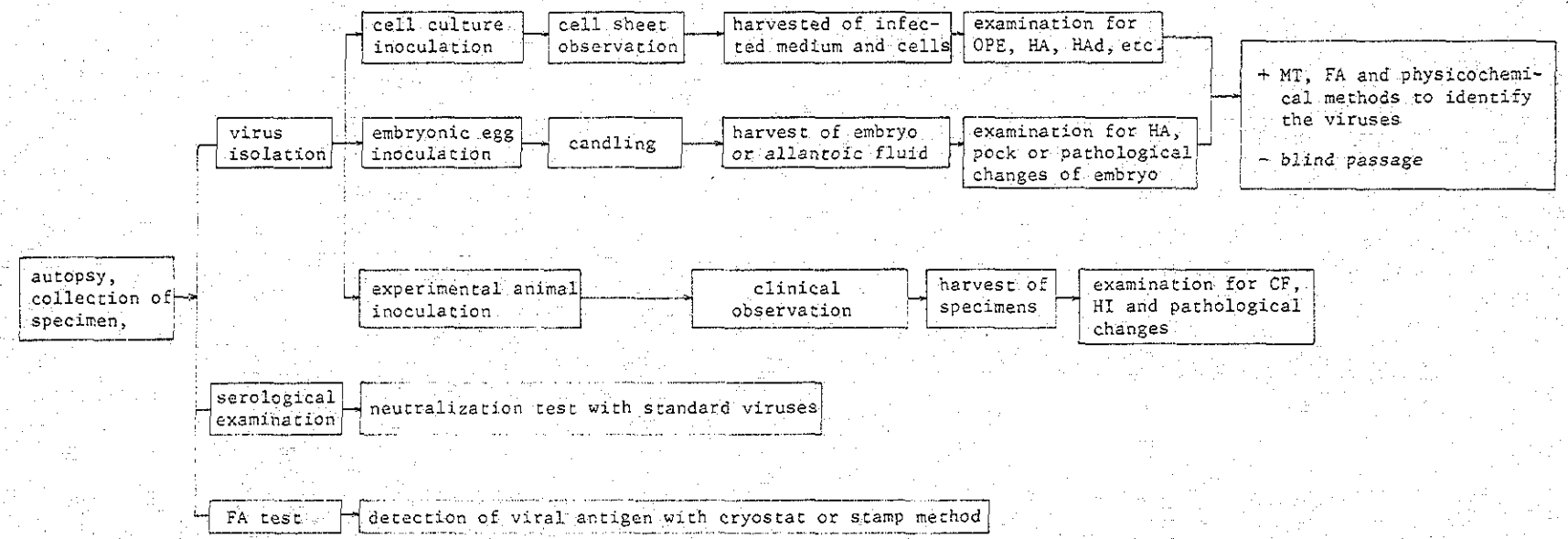
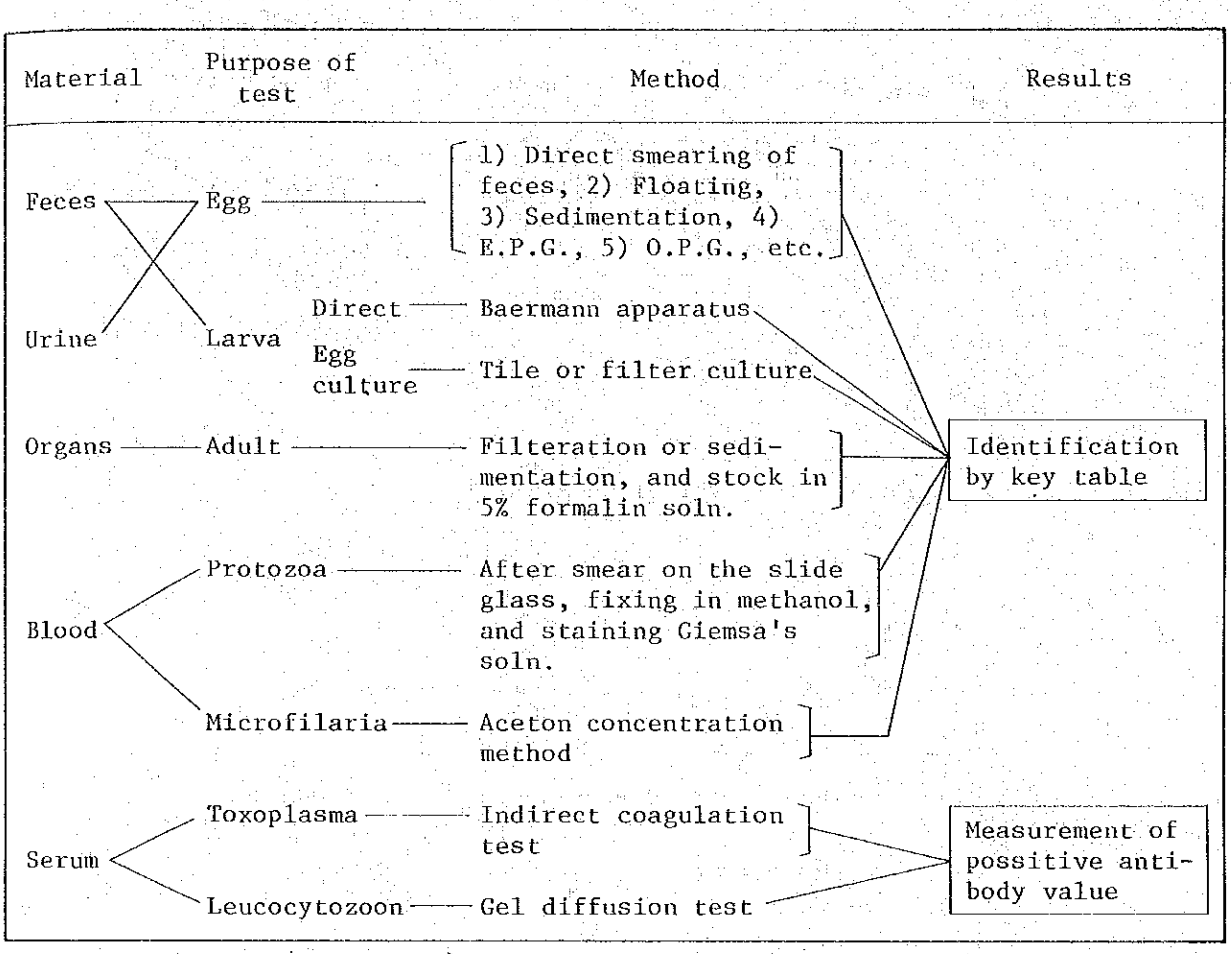


Figure 20. Examination chart in the parasitology section

1. Protozoa, Trematoda, Cestoda and Nematoda



2. Arthropoda

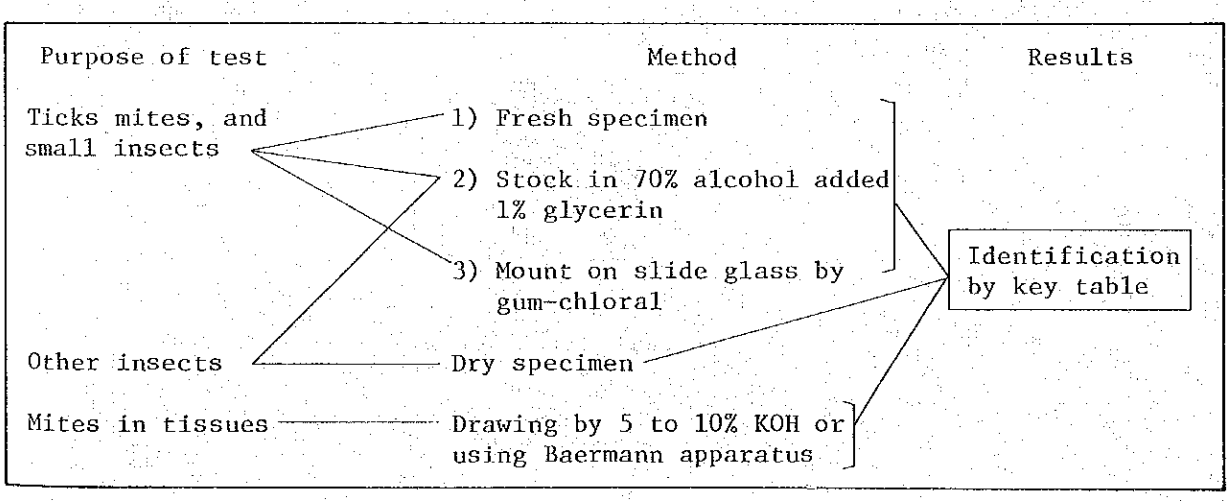


Figure 21 Examination Chart in the Pathology Section

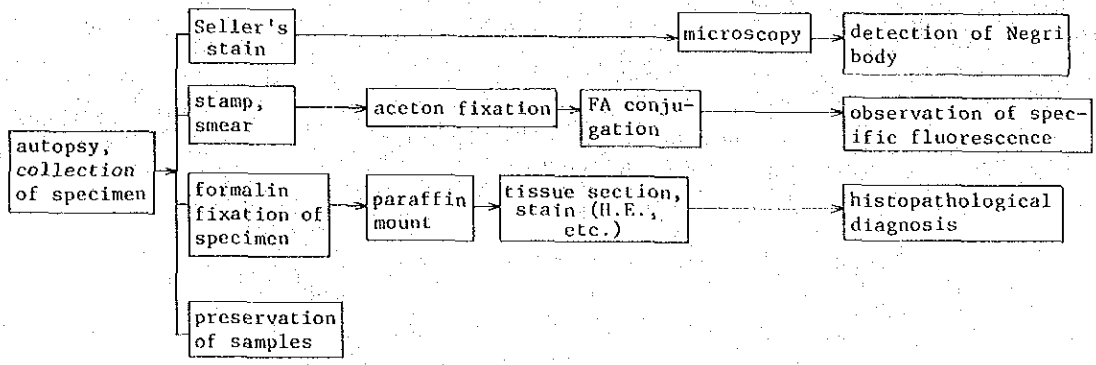
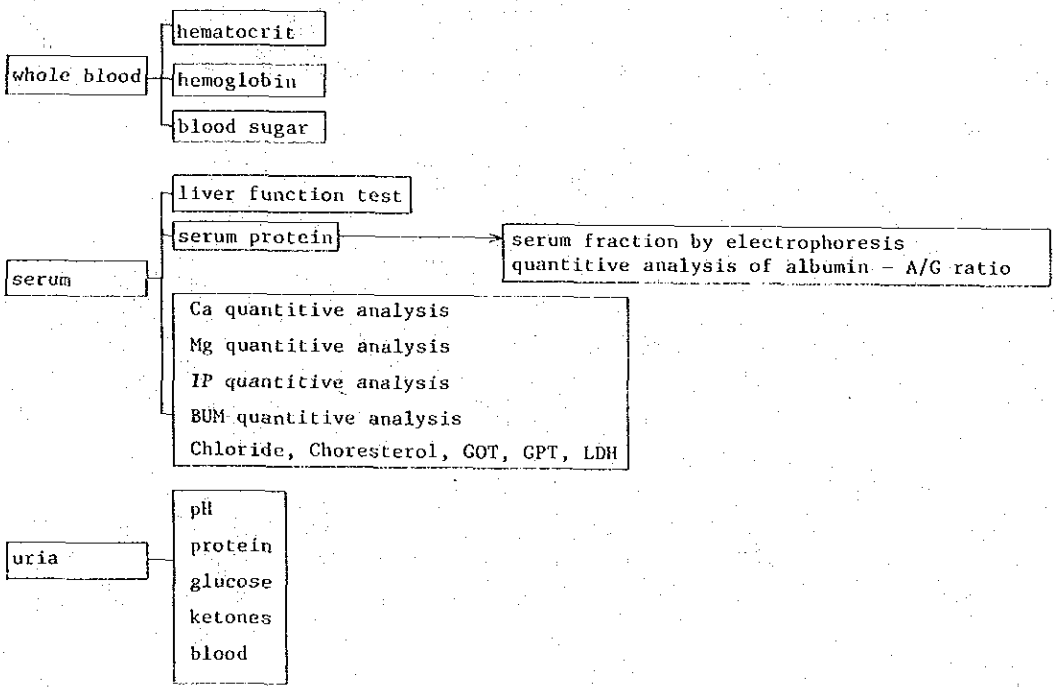


Figure 22 Examination Chart in the Biochemical Section



JAPANESE EXPERTS, CONTRIBUTORS TO THE PROJECT

I. Long Term Experts

(Medan)			(Tanjung Karang)		
Seiichi	Nagano	,	Ruizo	Ishitani	,
Yukio	Oshio	,	Kimiaki	Taguchi	,
Ikuo	Koike	,	Tamotsu	Ogata	,
Norikiyo	Yabe	,	Masashi	Ueda	,
Norihiko	Yoshida	,	Hiromi	Obara	,
Jun	Araki	,	Masahiro	Noda	,

II. Short Term Experts

Muneo	Ogata	,
Mituaki	Hayashi	,
Ichizo	Iwamoto	,
Junji	Yamaguchi	,
Eiichi	Senda	,
Yasuo	Miura	,
Toshitaka	Kono	,
Yoshio	Eiguchi	,

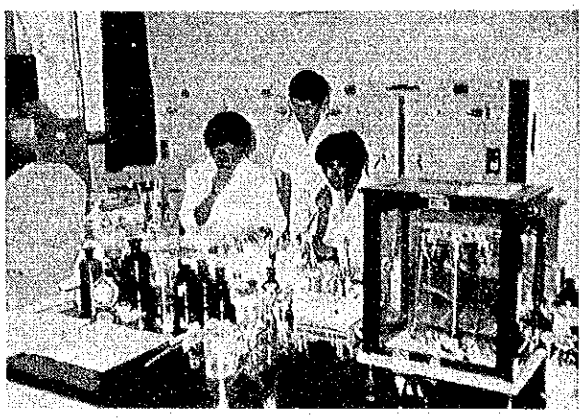
PART - II

REGION - III

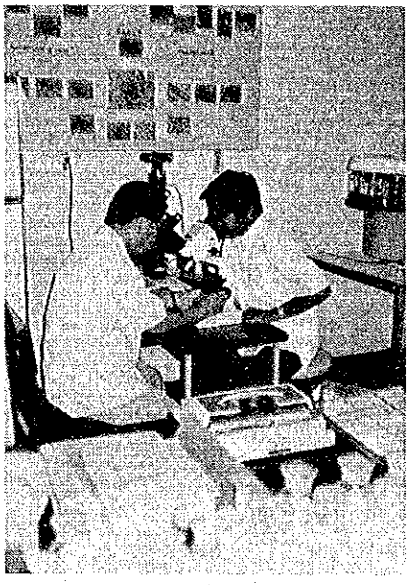
LAMPUNG, SOUTH SUMATRA AND BENGKULU

DISEASE INVESTIGATION CENTER, TANJUNG KARANG

Pathological autopsy of chicken



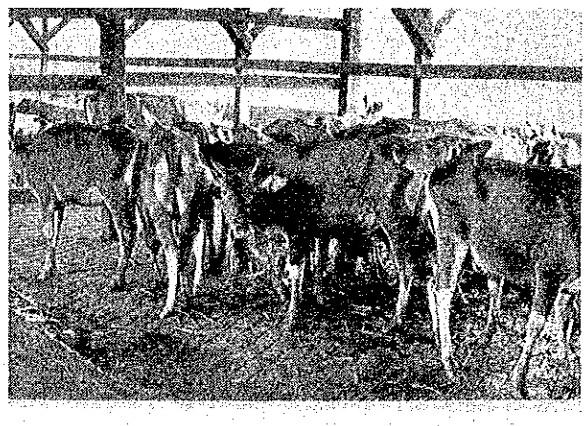
Serological test



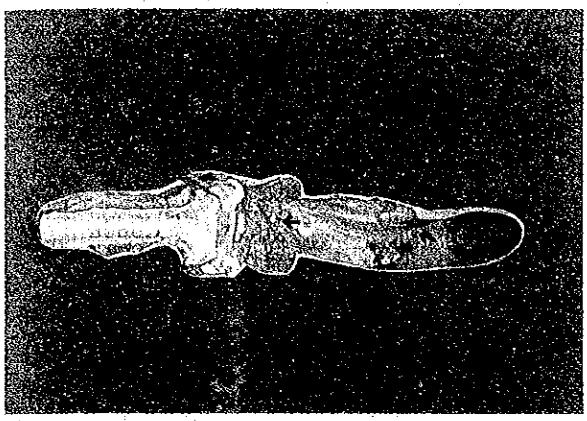
Discussion through micro-scopical examination

Aseptical operation

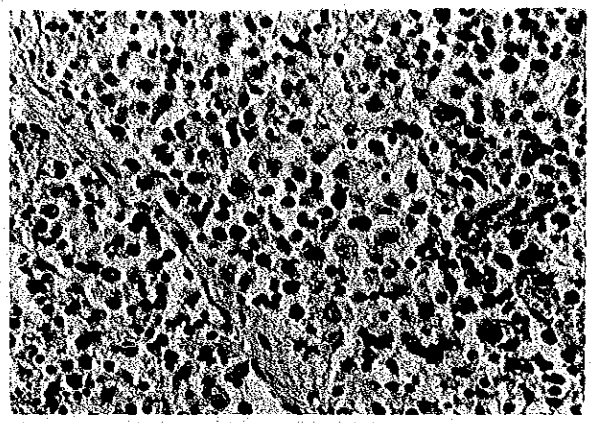
Blood tests for protozoa



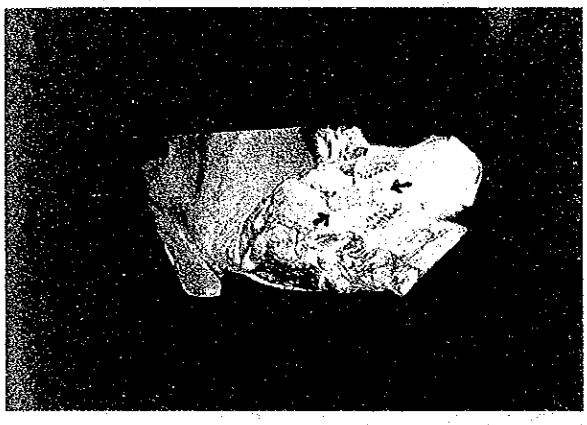
Quarantine of Bali cattles



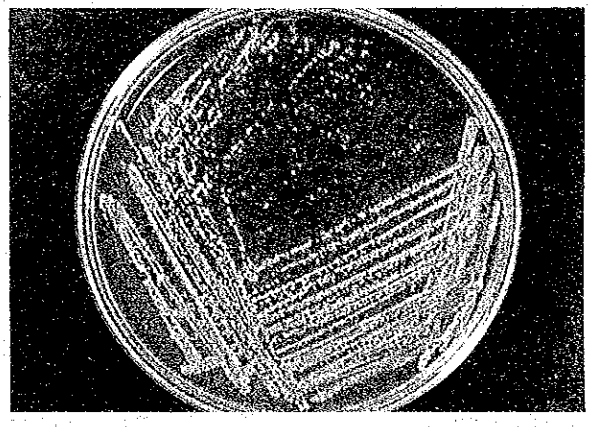
Erosion and ulcer of tongue (arrows) for Rama Dewa disease: Case No. 2



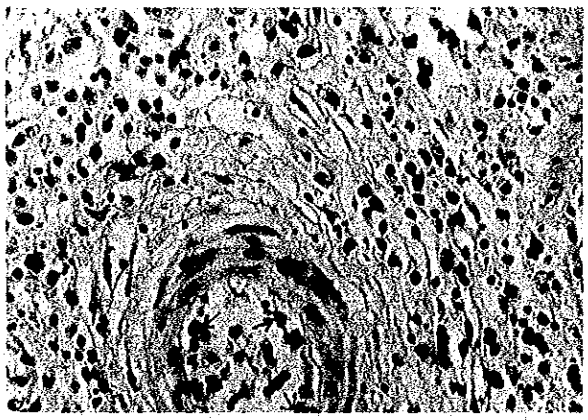
Lymphoid cell proliferation and aggregation of macrophages in lymph node for Rama Dewa disease: Case No. 2, HE staining, X 200



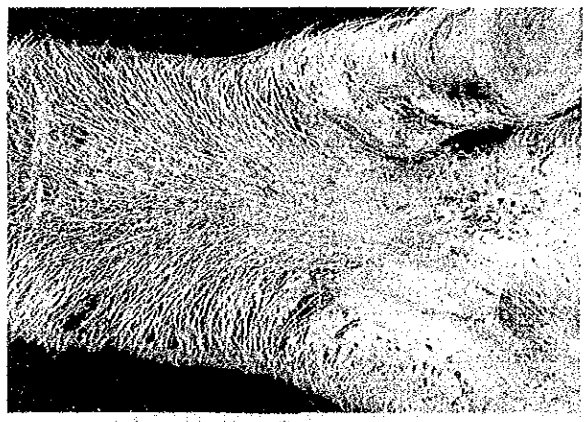
Ulcer of hard palate (arrows) for Rama Dewa disease: Case No. 2



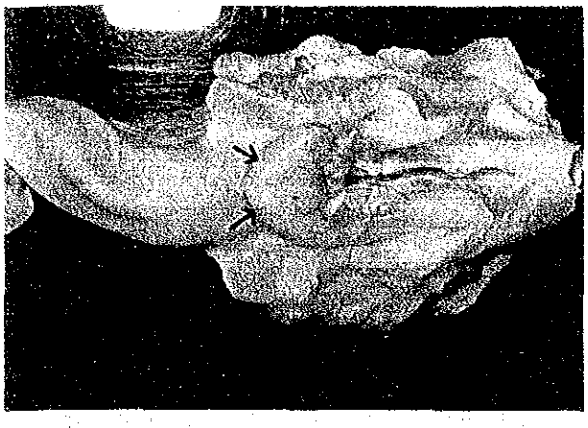
Colonies of Pasteurella multocida isolated from cases of buffalo



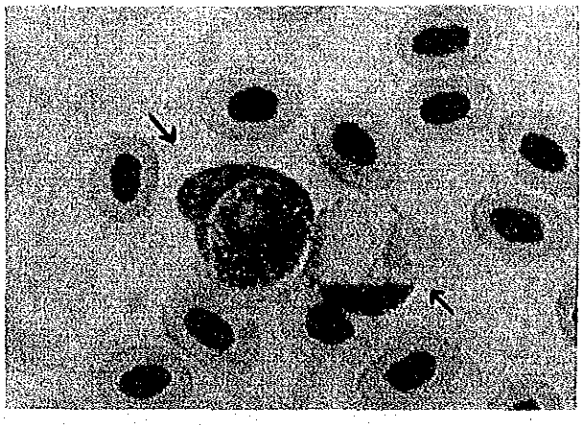
Vascular changes observed in submucosa of intestine for Rama Dewa disease: case No. 1, Hematoxylin-Eosin (HE) staining, X 200



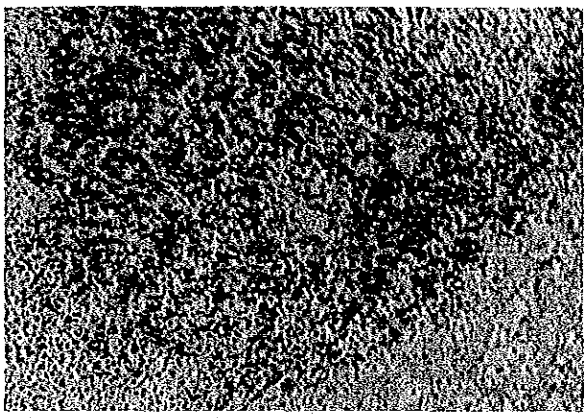
Erythema of skin at mandibular space for swine pasteurellosis: Case No. 2



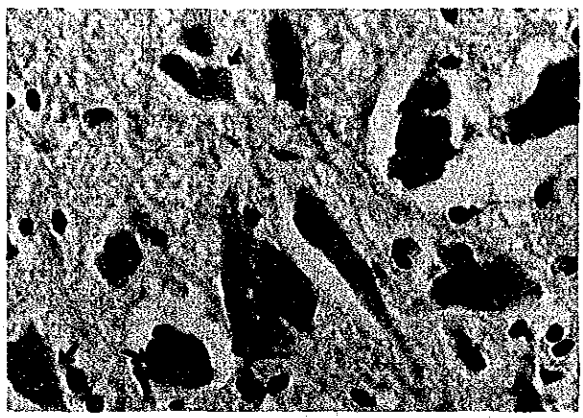
Marked edematous swelling of pharynx (arrows) for swine pasteurellosis: Case No. 5



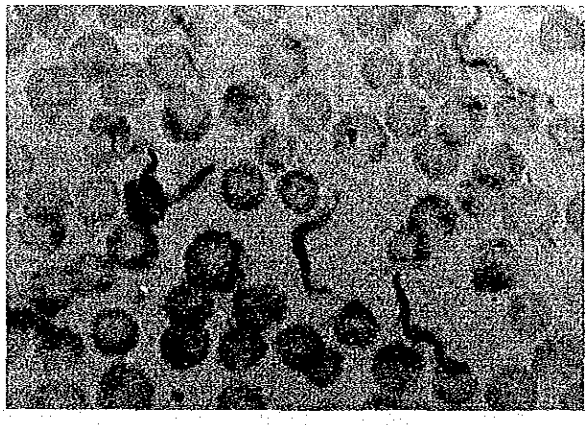
Leucocytozoon sabrasesi in chicken blood smears: Giemsa staining. X 1,000



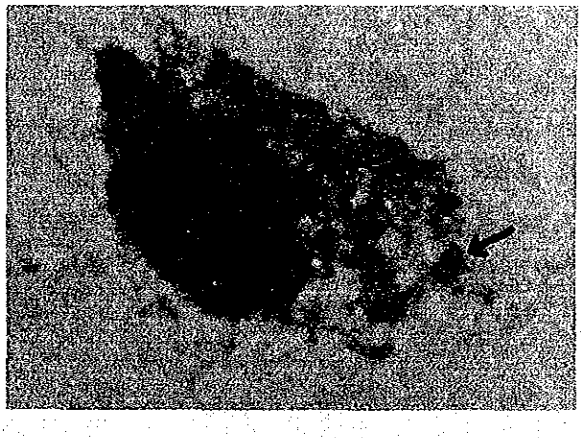
Serofibrinous pneumonia accompaning with neutrophilic aggregations for swine pasteurellosis: HE staining, X 100



Vascular lymphocytic infiltration and Negri bodies (arrows) for hippocampus of rabid dog: HE staing, X 400



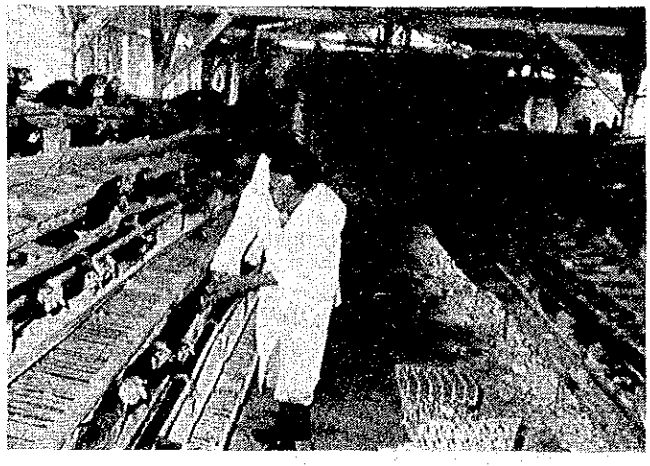
Trypanosoma evansi in cattle blood smears: Giemsa staining, X 1,000



Negri bodies (arrows) seen in cytoplasm of never cells for hippocampus of a rabid dog. Sellers staining, X 1,000

Health inspection of a cattle.

Pig farm where pasteurellosis in the pig occurred.



Poultry farm raising 400 chicken.

Report on the Activities of the Animal Disease Investigation Center, Region III. Tanjungkarang during the period under Record of Discussions of ATA - 133

by Ruizo ISHITANI, Kimiaki TAGUCHI and Toshitake KAWANO
(JICA Colombo Plan Experts assigned at DIC, Region III)
Tanjungkarang

I. Introduction

It has been 3 years and 7 months since DIC, Tanjungkarang began to function under the Record of Discussions of ATA - 133. Since Dr. F. X. Soesilo assumed the Director ship of DIC, the staff, increased to the present 7 veterinarians, 45 persons including veterinary assistants, administrative staff and workers.

On the other hand, Dr. Tamotsu Ogata, JICA Colombo Plan Expert, and the other 5 long-term and 6 short-term experts have come to DIC and cooperated with their Indonesian counterparts in the following activities;

1) Diagnosis of animal diseases
2) Investigation of animal diseases
3) Establishment of channels for collecting specimens from the field
4) Training in laboratory techniques for field and laboratory officers
5) Making recommendations on how to control and tract animal diseases

This report is designed to describe the outline of the results of the diagnostic services and fiels investigations which were carried out in the period from January 1979 to March 1982, and to refer to the important problems of DIC from the standpoint of the JICA Colombo Plan.

The contents of this report are nearly the same as those of the Annual Report of DIC, Region III. Tanjungkarang - 1979/1980, 1980/1981 and 1981/1982. (This will soon be published.)

Thanks are due to Dr. F. X. Soesilo, Director, and the staff of DIC, Tanjungkarang who has granted the funds for publishing this report.

II. Diagnostic services and field investigations

1. Specimens submitted to and collected by DIC

The specimens or materials consited of 5 kinds, A, B, C, D and E, namely, A: specimens submitted to DIC directly from the applicants, B and C: specimens submitted to DIC from the applicants through Animal Husbandry Offices of Provinces, Districts and Subdistricts, D: specimens collected from the filed by Special Survey Teams of the Animal Husbandry Offices and DIC, and E: specimens collected from the field by the DIC Survey Team.

In addition, materials of rabies-suspected dogs, cats and monkeys were brought from the human hospital.

The specimens listed above were distributed to the 4 laboratory sections of pathology, parasitology, virology and bacteriology by the diagnostician in DIC. In order to manage the specimens, blank forms were used from diagnostician to Section-chief (model F-1), from Section-chief returned to diagnostician (model F-2) and from diagnostician to director (model F-3), respectively. Then model F-3 was usually sent by mail through the General Affairs Section to the applicants. But in the positive cases in rabies, telegrams were used to let applicants know results quickly. (See Figure 1.)

Specimens could also be divided into 7 kinds and the methods of examination were as follows;

1) Dead and live animals

They were diagnosed at DIC or at the field where the animals died. As a result of post-mortem changes and etiological investigation, diagnoses were made as quickly as possible.

2) Heads and brains

In both materials, hippocampus of the brain has taken out and used for diagnosis of rabies. The method of how to diagnose rabies is as below;

Animals suspected of having rabies were brought to DIC and were clinically observed for 2 weeks. The diagnosis of rabies can be based upon the symptoms if they are typical, but should be confirmed by laboratory examinations. Fluorescent antibody techniques for the demonstration of rabies antigen (virus),

Seller's staining for Negri bodies, and histopathological examinations were routinely performed. In cases in which Negri bodies could not be demonstrated, and still non-suppurative encephalities was present, a mouse inoculation test was done.

3) Organs

Small pieces of organs, such as livers, spleens, lungs, hearts, kidneys, lymph nodes, etc. of animals dissected at the field were stored in glycerinsaline and fixatives of 10% formalin solution or 95% alcohol, and were usually sent by mail to DIC. These materials were used for the cultivation of bacteria and histological diagnosis.

In particular, unfixed hippocampus and other parts of the brain were routinely used in the fluorescent antibody technique for rabies and Seller's staining for Negri bodies.

4) Blood and serum

Sera from Cattle, buffalo, sheep and goats were used for serological tests, brucella rapid agglutination tests (RAT), tube agglutination tests (TAT) and complement fixation tests. As for the sera of chickens, the rapid-agglutination test of Salmonella pullorum and Mycoplasma gallisepticum and hem agglutination (HA) and hem agglutination inhibition (HI) tests were routinely performed.

Antigens for the serological tests stated above were as follows: Brucella RAT: Animal Disease Research Center, Bogor Brucella TAT and CFT: National Institute of Animal Health, Japan; Pullorum RAT: Serum Institute of Chiba Prefecture, Japan; Mycoplasma RAT: Division of Microbiology, Kyoto Biken Lab. INC., Japan; Newcastle Disease HI and HA: Nippon Institute of Biological Science, Tokyo, Japan.

The whole blood of cattle with EDTA added as an anticoagulant was employed for the measurement of hematocrit value. The serum-protein content was also measured in cattle.

5) Blood smears

In the blood smears which were fixed with methanol and stained with Giemsa solution, blood protozoas such as Trypanosoma evansi, Theileria sp., Babesia sp., and Anaplasma sp. in cattle, and

Leucocytozoon caulleryi, L. sabrasegi and Trypanosoma sp. were examined, respectively.

6) Feces

Parasitic eggs of Helminth contained in the feces of cattle, buffalo, sheep and goats were examined by the direct method in order to know the kinds of parasites in these animals. Of chicken feces, Ascaridia galli were examined.

7) Other materials

Cotton swabs of nasal and vaginal mucous discharges, small pieces of tissues collected from skin lesions, contents of abscess and edematous parts, etc. were also involved.

2. Numbers of applicants and specimens

The total numbers of applicants and specimens collected in DIC in the period from January 1979 to March 1982 are shown in Tables 1 and 2, for diagnostic services and field investigations respectively.
From both of these tables, we can know that most of the specimens were collected from Lampung Province until March 1980, but after that the specimens from other provinces increased gradually.

Lampung Province accounted for 91.1% of the total applications in 1980/1981, and 85.0% in 1981/1982, and also 93.6% of the total specimens in 1980/1981 and 91.7% in 1981/1982, respectively. But for the diagnostic services only, applications and specimens sent from South Sumatra and Bengkulu provinces increased yearly. (See tables 1 and 2)

For the kinds of animals, cattle and chickens were numerous, and occupied 97.8% of the total applicants for Jan. 1979/1980, 90.8% in 1980/1981 and 84.7% in 1981/1982, and also 96.7% of the total specimens in Jan. 1979/1980, 86.6% in 1980/1981 and 85.4% in 1981/1982, respectively. (See tables 3, 4 and 5).

Moreover, the number of specimens was shown by the kinds of specimens and animals.

The tables also indicate the abovementioned facts.
(See tables 6 and 7).

3. Results obtained in diagnostic services and field investigations

1) Findings on dead and live animals and organs

Heads and brains as shown in Tables 6 and 7 were involved in this.

a) Cattle and buffalo

In 118 applicants consisting of 114 cattle and 4 buffalo, the cases of infectious disease were low in percentage, but as for Rama Dewa disease and hemorrhagic septicemia, these were parts of animals which either died or were slaughtered.

It was detected that the diseases of respiratory and digestive organs and malnutritional disorder were important as a cause of death in cattle.

Especially the data of 1981/1982 revealed the importance of above-mentioned diseases in Brahman and Santagertudis Cattle imported from Australia since May 1981.

It was assumed that the changes of environment and feed due to transference from Australia to Sumatra might induce the autogenous infectious diseases of respiratory, digestive, circulatory and locomotive organs.

As seen in Table 8 about one-third of the applicants could not be diagnosed, because of the presence of severe, post-mortem changes and of no characteristic histological ones. From this data, it was pointed out that how to select and take the specimen pieces from dissected animals was important. (See Table 8).

b) Deer (See Table 9).

c) Sheep and goats

The pattern of the diseases was smilar to that of cattle. (See Table 10).

d) Swine

The swine raised in the Region of DIC were small in number, so that specimens were also small in number. In them, infectious and parasitic diseases were conspicuous. (See Table 11).

e) Chickens and ducks

In this paragraph 97% of the applicants were chickens (dead or live), and infectious diseases occupied the majority of the cases. Of the organs sent from the field, infectious bursal disease of chickens in Muara Enim of South Sumatra Province and Fowl Pox in Benskulu Province were noticeable as a first case of the disease for each district. (See Table 12).

f) Dogs and cats

Cases diagnosed as rabies occupied 93.3% of all applicants. Parasitic diseases were also important in dogs. (See Table 13).

2) Findings of blood and serum

a) Brucella rapid agglutination test

Fifteen out of 1,451 cattle (1.01%) in Jan. 1979/1980 and 42 out of 3,301 (1.27%) in 1981/1982 were positive in Brucella rapid agglutination test. (See Table 14).

Thirty nine sheep and 93 goats were examined in 1981/1982, and one goat was positive in Brucella rapid agglutination test. (See Table 15).

Forty-two cattle and one goat being positive in Brucella rapid agglutination test were examined by tube agglutination and complement fixation tests. As the result, 20 cattle were diagnosed as Brucellosis and 7 were considered as Brucellosis-suspected cattle. All cattle diagnosed as Brucellosis had been imported from Australia. (See Table 16).

b) Salmonella pullorum and Mycoplasma gallisepticum rapid agglutination tests

Seventy-two of 1,031 chickens (6.98%) in Jan. 1979/1980, and 2 out of 1,559 (0.13%) in 1980/1981 and 135 out of 1,031 (3.39%) were positive in Salmonella pullorum rapid agglutination test, and 63 out of 1,031 (6.1%) in Jan. 1979/1980, 230 out of 1,559 (14.75%) in 1980/1981 and 1,639 out of 3,978 (41.2%) in 1981/1982 were respectively positive in Mycoplasma gallisepticum rapid aggutination test.

In the chicken farms where the investigations of pullorum and mucoplasmosis were carried out, chicks have been bought

from the breeders at Jakarta, so that chicken breeding farms should be free from both diseases. (See Table 17).

c) Investigations of antibodies against Newcastle disease virus by use of hem agglutination inhibition test

Investigations of HI antibodies against Newcastle disease virus were carried out in Lampung Province chicken farms. In the investigations, one applicant consisted of 10 chickens. GM values of HI antibody were measured on 22 applicants in North Lampung, 102 in South Lampung, 74 in Central Lampung, 95 in Tanjungkarang-Telukbetung and 41 in I. Chicken Farm, respectively. As the results, the number of applicants which showed GM value of less than x 64 (included x 64) were 15 (68.2%) in North Lampung, 45 (60.8%) in Central Lampung, 51 (50.0%) in South Lampung, 63 (66.3%) in Tanjungkarang-Telukbetung and 20 (43.5%) in I. Chicken Farm, respectively. In these applicants, inoculation with Newcastle disease vaccine was performed or advised. (See Table 18).

d) Serum-protein content and hematocrit value of cattle

Serum protein of less than 6.0% (excluded 6.0%) and hematocrit value of less than 20% (excluded 20%) were considered as abnormal values in this instance. One hundred and fifty out of 1,192 cattle (12.58%) and 83 out of 1,302 (6.37%) showed abnormal values of serum-protein content, 55 out of 1,108 (4.96%) in 1980/1981 and 43 out of 732 (5.87%) were abnormal in hematocrit value. (See Table 20).

3) Findings on blood smears

a) Examinations of Protozoa in the blood smears of cattle and buffalo

Results were as follows; 9 out of 1,332 cattle (0.68%) in Jan. 1979/1980, 15 out of 2,033 (0.72%) in 1980/1981 and 9 out of 3,130 (0.03%) in 1981/1982 were positive in Trypanosome evansi, respectively. 58 out of 1,332 cattle (4.35 percent) in Jan. 1979/1980, 77 out of 2,033 (3.79%) in 1980/1981 and 84 out of 3,130 (2.68%) was positive in Theileria sp., respectively. Babesia sp. was positive in 10 out of 1,332 cattle (0.75%) in Jan. 1979/1980, and 2 out of 3,130 (0.01%) in 1981/1982. Of Anaplasma sp., 3 out of 1,322 (0.02%) in Jan.

1979/1980, 15 out of 2,033 (0.73%) and 19 out of 3,130 (0.60%) were positive, respectively.

The total number of buffalo was 66, and in these Trypanosoma sp., Theileria sp. and Anaplasma sp. were found in 2, 2 and 3 cases, respectively. (See Table 21).

b) Examination of Protozoa in chicken blood smears

Results were as follows; 3 out of 326 chickens (0.92%) in Jan. 1979/1980, 4 out of 1,196 (0.33%) in 1980/1981, and 46 out of 3,647 (1.26%) in 1981/1982 were positive in Leucocytozoon caulleryi, and 49 of 1,196 (5.00%) in 1980/1981 and 37 out of 3,647 (0.10%) were positive in Leucocytozoon sabrasesi, respectively. Trypanosoma sp. was detected in only one chicken in 1981/1982. (See Table 22).

4) Findings of feces

a) Detection of helminth by the examination of parasitic eggs contained in the feces of cattle

Fasciola sp., Oesophagostomum sp., Cooperia sp., Paramphistomum sp., and Bunostomum sp. were constantly parasitized in cattle. (See Table 23).

b) Detection of eggs of Ascaridia galli in chicken feces

As for Ascaridia galli eggs, 281 out of 689 chickens (41.1%) were positive in the feces, and it was pointed out that a scariasis is very important in chickens. (See Table 24).

5) Viruses identified, and viral antigens and antibodies detected by Virology Section (See Tables 25 and 26).

6) Bacteria and fungi identified, and bacterial antibodies detected by the DIC Bacteriology Section (See Tables 27 and 28).

7) Protozoa and endo-and acto-parasites identified by the DIC Parasitology Section (See Tables 29 and 30).

4. Important diseases occurring in the Tanjungkarang Region of DIC

1) Rama Dewa Disease

(1) Occurrence and symptoms

The enzootic disease of cattle broke out for the first time at Rama Dewa village, subdistrict of Seputih Raman, Central Lampung

on May of 1976, so that this disease has been called the Rama Dewa disease. Since then, this disease occurred in 1978, 1979, 1980 and 1981 in only Central Lampung, but in 1982 in Tanjungkarang-Telukbetung. It was in August, 1980 that we experienced for the first time the disease at the villages of Astomulyo, Sidomulyo, Rama Utama, and so on in Central Lampung.

Afterwards this disease continued to occur, and many Bali cattle died (Fig. 2).

Rama Dewa disease is a serious infectious disease, with its mortality rate very high. Only Bali cattle suffered from the disease. Main clinical symptoms were fever, anorexia, congestion of conjunctiva, excretion of mucous or mucopurulent nasal discharge, marked swelling of prescapular and mandibular lymph nodes and watery or bloody diarrhea. Bloody sweating which was considered as one of the characteristic symptoms in Jembrana disease was supposed to be present, but this was uncertain. There was usually a period of 8 - 10 days from the onset of symptoms to death or slaughter.

(2) Pathological findings

Main pathological changes in the cases investigated at DIC are shown in Table 31. Erosion and ulcer of tongue, plate, pharynx, and sometimes esophagus and rumen, congestion, hemorrhage, erosion and ulcertion of abomasum and intestine, and erosion and ulceration of the upper respiratory tract were prominent. But in some cases such lesions were either slight or absent.

The most characteristic histological changes in this disease were the marked proliferations of lymphoid cells in the liver, spleen, lymph nodes, lungs, kidneys, etc. Lymphoid cells had nuclei and cytoplasms bigger than that of lymphocyte, and often showed cytoplasmic basophilia. Lymphoid cells usually proliferated in Glisson's sheath of liver, perivascular spaces of central and follicular arteries, and red pulp of spleen, lymphoid tissues of lymph nodes, alveolan septum and perivascular space of blood vessels of lung, and the perivascular area of kidney. Besides proliferation of lymphoid cells, vasculitis showing leukocytic cell infiltration of the vascular walls was observed in livers, lungs and intestines.

Microscopic examination of the central nervous system revealed edema and slight lymphocytic aggregation of vascular walls in case No. 2, but no changes in other cases. (See Table 31).

(3) Differential diagnosis

Considering the lesions of the alimentary organs, Rama Dewa disease resembled BVD-MD (bovine virus diarrhea-mucosal disease); however, BVD-MD affects usually calves, and adult cattle don't die with the disease. Moreover, lymphoid proliferation of parenchyma tous organ was not present in BVD-MD (W.R. Prichard et al. 1956, F.K. Ramsey & W.H. Chivers, 1953 and S. Inui, et. al. 1978).

Rama Dewa disease also resembled the rinderpest and hemorrhagic septicemia of cattle because of high mortality and clinical symptom, but this disease could be differentiated from both diseases with the characteristic lesions of parenchymatous organs mentioned already.

From the point of differential diagnosis, the most important infectious diseases were BMCF (bovine malignant catarrha fever) and IBR (Infectious bovine rhinotracheitis). Both diseases are due to herpes virus, and BMCF resembled Rama Dewa disease very much from the points of changes to the upper alimenatry and respiratory organs, and in the presence of vasculitis and lymphoid cell infiltration of parenchymatous organs (C.J. Mare, 1977; F.M. Hamdy et al., 1978; I.E. Selman et al., 1978).

In BMCF, the presence of nonpurulent encephalitis has been emphasized (A.R. Kahter, 1963); however, these changes were not found in the present cases of Rama Dewa disease. Dr. Ruguh Darmadi (1979) reported Bali Island that Rama Dewa disease greatly resembled Jembrana disease occurring on from clinical and pathological findings. There is a report by Dr. S. Iwan, T. Budiarso and Socharjo Hardjosworo, indicating the details of clinical and histopathological findings of Jembrana disease. Causal agents of Jembrana disease have not yet completely been clarified, so etiological investigations into Rama Dewa disease are very important problems in Indonesia at the present time.

Comments: The present data was reported by Hadi Prabowo et al. at the Seminar of Animal Husbandry and Animal Health held at Bogor on 8th - 11th of February, 1982.

2) Hemorrhagic septicemia of Cattle and Buffalo

(1) Occurrence

Sub-districts of Lampung Province in which hemorrhagic septicemia of cattle and buffalo occurred in the recent 3 years are shown in Fig. 3. However, the exact number of cattle and buffalo which suffered from this disease is not known because the disease had come to an end when we went to the subdistricts where the disease had occurred.

In the outbreak at Kedaton, South Lampung in August 1981, many animals showed sudden attacks of fever and anorexia and died. Bacteriological and pathological investigations resulted in the isolation of Pasteurella multocida from several kinds of organs of one buffalo and characteristic histological changes. Also, in another case of buffalo, the same bacteria were isolated from nasal swabs.

(2) Properties of Isolated Bacteria

As already stated, Pasteurella multocida was isolated from 2 buffalo, and its biological properties were as follows.

a. Morphological identification

(a) Loeffler's methylen blue staining: Coccoid bipolar in staining

(b) Gram staining: Gram negative

(c) Capsule staining: Positive in capsule

b. Characteristics in culture of agar media

(a) Trypto-soy agar: Colonies were mucoid, white blue in colour, and 0.5 - 10 mm in diameter for 24 hours.

(b) MacConky agar: Did not grow.

(c) Trypto-soy blood agar: Colonies were mucoid, no hemolysis, white blue in colour and 0.5 - 1.0 mm in diameter for 24 hrs.

c. Characterization tests

Catalase	+
Motility	-
H_2S (SIM)	-
Indol	+
Citrate utilation	-
Lysine decarboxylase	-
Nitrate	+
Urease	-
VP	+
IPA	-
Malonate	-
Glucose	+
Lactose	-
Saccharose	+
Maltose	-
Mannitol	+

(3) Clinical and pathological findings

Typical cases of this disease could neither be observed clinically nor pathologically, but pathologic examinations of the organs of diseased buffalo revealed findings of septicemia such as hemorrhage, necrobiosis and mass of bacteria of spleen, hemorrhage, edema and neutrophilic infiltration of lung, hemorrhage and neutrophilic infiltration of liver and neutrophilic infiltration of tonsil.

3) Swine pasteurellosis

(1) Occurrence

Swine pasteurellosis broke out in 5 sub-districts of Lampung Province in the last 3 years (Fig. 3). In one outbreak in January, 1981, about 60 head of swine died showing an acute disease course, and in that in October, 1981, 60 out of 300 swine died.

(2) Properties of isolated bacteria

Pasteurella multocida was purely isolated from heart blood, spleen, lung, liver, kidney and mandible lymph node of diseased swine.

The morphology of Pasteurella multocida was the same as that of pasteurella isolated from the buffalo mentioned before; however in the biological properties, one strain from swine showed lactose (+), saccharose (+), and maltose (+), and another strain from swine mainfested lactose (-), sacharose (+) and maltose (-), compared with the strains from buffalo (see the paragraph on hemorrhagic septicemia of cattle and buffalo).

(3) Clinical and pathological findings

The disease occurred 2 to 6 months after birth. As clinical signs, there were fever, anorexia, erythema of the skin, and marked subcutaneous edema of mandibular and neck. The period from the onset of symptoms to death was about one week.

As the pathological findings, subcutaneous inflammatory edema with leukocytic infiltration, inflammatory edema of laryngio-pharyngial space and serofibrinous pneumonia were prominent.

In the periacute form of the disease, petechial hemorrhage of the lung, heart, liver, spleen and kidney were present. There were cases showing severe congestion and intestina hemorrage.

The pneumonic type has been commonly known in swine pasteurellosis (Hagan's Infectious Diseases of Domestic Animals, 1973) but, present cases were of the septic type, and pathological findings were the same as those reported in hemorrhagic septisemia of cattle and buffalo.

Comments: Hemorrhagic septicemia of cattle, buffalo and swine is the main research subject of the Bacteriology Section of the DIC.

4) Surra - trypanosomiasis of cattle and buffalo

The cattle and buffalo infected with Trypanosoma were widely present in Lampung province; however, they were not yet found in South Sumatra and Bengkulu Provinces. As the results of surveys performed in the period from January 1979 to March 1982, it became clear that diseased cattle were few in number (see Table 21 and Fig. 4), but animals having a lot of Trypanosoma in their blood were present.

This protozoa was identified as Trypanosoma evansi by Prof. J. Holz, Department of Parasitology, Faculty of Medicine, Pajajaran University, Bandung, West Jawa, using blood smears of severely infected

cattle sent from DIC, Tanjungkarang.

Two ml. of the whole blood from the cattle mentioned above were inoculated intraperitoneally into guinea pigs. One out of 2 guinea pigs died 4 days after inoculation, and another one showed severe parasitemia on the 5th day (1st generation). Three guinea pigs were inoculated intraperitoneally with blood of the 1st generation guinea pigs, and they all showed severe parasitemia 5 or 6 days after inoculation. At the stage of severe parasitemia, the blood of guinea pigs was collected, anticoagulated, diluted with 20 percent glycerin-Alsever solution at the rate of 1:1, and stored in a deep freezer at -70°C.

Furthermore, one tube of stocked blood was dissolved in an incubator at 37°C, and one ml. was inoculated into the peritoneal cavity of a guinea pig after confirming the movement of Trypanosoma. This guinea pig (3rd generation) showed parasitemia within a few days, and its blood was also stored in the same deep freezer, by the same method.

In North Lampung, there has been a disease with buffalo exhibiting nervous symptoms and dying, and it has been assumed that the cause of this disease may be Trypanosoma. This problem should be clarified by inoculation experiments in near future.

5) Babesiosis of cattle

The first case of Babesiosis in cattle occurred in Central Lampung of Lampung Province in 1979. Recently, 2 dairy cattle suffered from Babesia sp. and died at a dairy farm near Palebang, South Sumatra.

Icterus and hemoglobinuria were marked and Babesia sp. was observed in the blood smears of both cattle.

6) Theileria and anaplasma infection in cattle

In parallel with the investigation of Trypanosoma sp., the frequency of parasitism was examined on Theileria sp. and Anaplasma sp. by the blood-smear method. As the results, 219 and 39 out of 6.495 cattle (3.37 and 0.57%) were positive in Theileria sp. and Anaplasma sp., respectively. (See Table 21).

As for the serum of 16 cattle, a complement fixation test of Anaplasma marginale was carried out, and it was positive in x10 in 6 cases of which 3 were also positive in Anaplasma sp. by the blood-smear

method. There was a record that severe Anaplasmesis occurred in Central Lampung of Lampung Province in May 1979, but since then no cases have occurred in the Region of DIC.

7) Leucocytozoonosis in chickens

Two kinds of Leucocytozoon (L), L. caulleryi and L. sabrasesi were present in Lampung Province (Fig. 7).

In the investigation by the blood-smear method, 53 (1.02%) and 36 (1.67%) out of 5.169 chickens were positive in L. caulleryi and L. sablasesi, respectively. (Table 22).

In the blood smears, the majority of gametocytes of L. sabrasesi were spindle shaped, and the host cell nuclei were seen adjacent to them, but some were round in shape with or without flaggellum-like structure. A few of gametocytes were free from host cells.

Gametocytes of L. caulleryi were observed in the blood smears of chickens of showing different degree of anemia.

Up till now, schizons of L. caulleryi were only observed in the intestine and lung of one chicken raised at a chicken farm in Tanjungkarang. The outbreak of Leucocytozoonosis which is due to schizogony of L. caulleryi, has not yet been found in this district.

An agar-gel immunodiffusion test (AGT) of L. caulleryi (antigen used was prepared by Dr. Tsutomu MORII, Department of Parasitology, Faculty of Medicine, Kyorin University, Tokyo, Japan) and the blood-smear method of L. caulleryi and L. sabrasesi were investigated, and the results shown in Table 33 were obtained. In the majority of the poultry farms where AGT-positive cases were present, gametocytes of L. caulleryi were found in the blood smears of chickens. Sera of chickens in which L. sabrasesi was observed in the blood smears were negative in AGT of L. caulleryi. (See Table 33).

Relationships between the prosperity of Culicoides and the occurrence of Leucocytozoonosis, and also that of Simulium, the vector of L. sabrasesi, and L. sabrasesi infection are not yet known.

8) Rabies

Rabies is one of the most important zoonoses in the region of DIC, Tanjungkarang, and the diagnostic service of this disease began in August

1979. The number of dogs and cats which bit man increased year by year, and the total number of animals examined at DIC was 240 of which 146 (60.8%) were positive in rabies. (See Table 34).

In the Tanjungkarang region of DIC, especially in 1981/1982, the province of Bengkulu was the highest in the percentage of occurrence of Rabied animals.

Their percentages were 74.3 in Bengkulu, 64.7 in South Sumatra and 58.9 in Lampung Provinces, respectively. (See Table 35).

Figure 8 indicates the distribution of Rabied animals in the Region of DIC, Tanjungkarang. (See Fig. 8).

In the stamp smears of hippocampus stained by Seller's method, Negri bodies were reddish-violet or dark red, while nuclei of nerve cells were blue in colour. Negri bodies in hippocampus or other of the brain of animals diagnosed as rabies were detected in 100 percent.

Histological examination of brain samples of Rabied animals revealed marked perivascular lymphocytic infiltration, modular and diffuse proliferation of gliacells and Negri bodies in nerve cells. Neuronophagia was sometimes observed. Lesions of nonpurulent encephalitis stated above were detected in 53 percent of all cases diagnosed as Rabies.

9) Poultry Diseases

(1) Newcastle disease

Newcastle disease is the most important disease for poultry, has broken out all year in the DIC region, so that the prevention of this disease is a problem of pressing need. The disease was of an acute or subacute septic type, and usually diagnosed by the presence of characteristic lesions and proof of viral antigen by use of fluoresent antibody technique. (See Table 18).

(2) Avian infectious bronchitis (IB)

There was an outbreak of a respiratory disease in chickens in the Lampung Province, and fluorescent antigen of IB virus was proved to be present in the mucous discharge of chicken trachea. But the mode of occurrence has not yet been clarified.

(3) Fowl pox

This disease has occurred in the DIC Region.

(4) Infectious bursal disease of chickens

A disease of broiler chicks occurred at Muara Enim, South Sumatra Province, and was diagnosed as an infectious bursal disease of chickens from the findings of epidemiology and histopathology. The virus for this disease has not yet been isolated.

(5) Marek's disease

The disease has occurred in some poultry farms in Lampung Province, and was classical in type, it was not acute. Enforcement of vaccination is important.

(6) Avian lymphoid leukosis (LL)

In chicken autopsied at DIC, this disease was often found, so that its eradication is very important. The most noteworthy matters are to disinfect the chicken sheds where baby chicks are raised, and not to buy baby chicks from breeding farms where this disease has occurred.

(7) Pullorum disease

(8) Chronic respiratory disease of poultry (CRD)

(See the paragraph of S. pullorum and M. gallisepticum rapid agglutination test)

(9) Coccidiosis

This disease occurred mostly in chicks.

10) Parasitic Diseases

(1) Liverfluke disease of cattle

As for the eggs of parasites, the feces of 5,588 cattle were examined over the past 3 years and 3 months, and the positive rate of a sp. was 9.63 percent. Marked hepatic lesions due to Fasciola sp. have also been found in slaughter houses, so that field investigation of this disease is now being carried out in Lampung Province.

(2) Haemonchiasis of cattle, sheep and goats

The disease caused by Haemonchus contortus has frequently occurred in cattle, sheep and goats in Lampung Province.

The characteristic post-portem changes are cachexia and severe hemorrhages and abomasum edemas and duodenum due to Haemonchus. Treatment by insecticide should be carried out in the early stage of infestation.

(3) Lungworm disease of cattle

Pneumonia caused by lungworm (Dictyocaulus viviparus) was observed in one animal imported from Australia, but this disease has not been found in native cattle as yet.

(4) Ascariasis of swine and chickens

Parasitic rate of Ascaris was very high in swine and chickens. (See Table 24).

(5) Swine kidney-worm disease

Swine raised at the village of Rama Dewa, Central Lampung, suffered from this disease, and a lot of Stephanurus dentatus eggs were found in the urine of this swine, so this disease may spread in this area.

11) Nutritional disorder - malnutritional cachexia in Bali Cattle (Sheeping disease)

Many Bali Cattle transported from Sulawesi, and West and East Nusa Tenggara to Panjang harbor, Lampung Province, died during the quarantine period.

In post-mortem examinations, subcutaneous edema was conspicuous, especially at the mandible space, and mucoid degeneration of the adipose tissues of coronary gloove of heart, omentum, mesentery and bonemarrow was marked. Spleens, kidneys and livers showed atrophy. A few helminth were found in rumen and intestines in some cases, but lesions were not present.

The changes stated above were the same as those seen in starvation cases and it was assumed that the causes were malnutrition which occurred either before or during shipping.

12) Bali Sickness

Bali sickness or Bali ziekte is the disease which occurs only in Bali Cattle, and is found not only in Bali but also in Sulawesi and East

Nusa Tenggara. In the DIC Region, Tanjungkarang, this disease occurred in Lubuklinggau of South Sumatra Province in 1978, and then in Punggur of Lampung Province in 1980.

Clinical signs are the erythema, serous infiltration and necrosis of skin of nose, ear, abdomen, limbs and hips. Sometimes, cattle died with icterus.

Dr. Soebari, Staff of DIC, Ujung Pandang, reported that the Lantana camera, a poisons wild plant, was the cause of this disease.

When one Kg of this plant was given to the cattle they became sensitive to sunlight, and upon getting sunshine the skin manifested the changes stated above.

In Lampung Province, 2 Bali cattle suffered from Bali sickness in April 1980, but after that no cases has reported up till now.

13) Feed poisoning of chicken occurring in South Lampung

An acute chicken disease broke out at a big chicken farm in South Lampung, 948 out of 60,000 adult chickens became sick, and about 50 percent of them died or were slaughtered. No chicks suffered from this disease. Clinical signs were anorexia, marked cyanosis and edema of comb, face and neck. Death occurred within 2 or 3 days after the onset of symptoms, Autopsy of dead chickens revealed severe subuctaneous edema of head and neck, marked hemorrhage of breasts and thigh muscles, and petechial hemorrhages of ovary, kidney, heart and proventriculus. No encephalitic change could not be observed histopathologically. After bacteriological and virological examinations, no meaningful agent were isolated. At the chicken farm Clopistat, an anticoccidial drug, was mixed into the feed at a rate of 500 gr per ton (0.05%), and fish-meal imported from Chile was also mixed in the same feed. Adult chickens were fed for 7 days, and chicks were fed for 3 days.

Experiments using adult chickens and the feed in question were carried put at DIC. As the results, bacteria and virus were both denied as being the cause, and it was assumed that the feed may have been the cause of this disease.