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lestoquardi. In this present case animal was affected with rod shaped theileraial piroplasm in accordance with Smith and Sherman (loc. cit). *Pasteurella* sp is a commensal organism in the upper respiratory tract of animals (EI Imam and Taha, 2015).

Condition such as poor nutrition, crowding, parasitism, malnutrition and transport will favour the entry of organisms into lungs. The leukotoxin released from the bacteria lyse the alveolar macrophage and neutrophils, the enzymes released from the lysed cells causes injury to the lungs. Penicillin, ampicllin, oxytetracyline, tylosin, ceftiofur, florfenicol can also be given. Prevention is through prompt vaccination, proper ventilation, inclusion of Vitamin E and selenium in feed.

Summary

The present study concluded that the death in the goat flock was due to mixed infection, as the individual organism will not cause high mortality. However the decline in host resistance is responsible for concurrent infection in this flock.

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Clinical Laboratory Study of Dairy Cattle Infected by Blood Parasites

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Abstract

Epidemiological study for monitoring of blood parasites was conducted in Indonesia. The present study was to detect the blood parasitic diseases and health status of dairy cattles in Bogor. Hematological analysis and blood smear examinations were done for the dairy cattle. Fifty blood samples of dairy cattles were eamined out of which Anaplasma (7); Babesia (7) infection of plasma and Babesia (18) and neative samples (18) were recorded. The results indicated 50% of blood samples were positive for blood parasites.

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Key words : blood parasite, epidemiological study, hematology

Many vector borne diseases were reported in the dairy cattle farms such as *Babesia* sp., *Anaplasma* sp., *Theileria* sp., and *Haemobartonella* sp. The epidemiological study on these diseases is rare. The blood can be used for evaluation of dairy cattle health status (Gonçalves *et al*., 2015). This research was carried out in Bogor region in Indonesia dairy cattle to assess the distribution of blood parasites.

Materials and Methods

Fifty blood samples were taken from 2 – 5 years

Table I. Blood Profile of erythroparasite percentage in blood samples at KUNAK region, Bogor.

Number of sample (N)	Parasite type	Percentage
7	*Anaplasma* sp. (A)	0.63 ± 0.21
7	*Babesia* sp. (B)	0.70 ± 0.50
18	*Anaplasma* sp.& *Babesia* sp. (AB)	0.69 ± 0.33
18	Normal Control (non parasitemia) (NC)	-

Table II. Haematological profile of RBC and its component in dairy cattle blood at KUNAK region, Bogor.

Number of sample (N)	Parasite type	Haematological values (RBC and its component)					
		Erythrocyte ($x10^6$/uL)	Hb (g/dL)	Hct (%)	MCV (fL)	MCH (pg)	MCHC (g/dL)
7	*Anaplasma* sp. (A)	6.30^{b} ± 0.61	10.79^{b}±1.07	31.86^{ab}±3.48	50.56^{a}±2.52	17.13^{b}± 0.85	33.89^{b}± 0.57
7	*Babesia* sp. (B)	6.34^{b} ± 0.71	10.81^{b}±1.16	32.71^{b}±4.15	52.51^{a}±12.2	17.34^{a}± 3.69	33.12^{a}± 0.67
18	*Anaplasma* sp.& *Babesia* sp. (AB)	5.39^{a} ±1.03	9.52^{a}±1.47	28.56^{a}±4.40	54.43^{a}±12.96	18.15^{a}± 4.30	33.34^{a}± 0.48
18	Normal Control (non parasitemia) (NC)	7.32^{c} ±0.67	11.69^{b}±1.18	36.50^{b}±3.49	49.79^{a}±2.86	16.40^{a}± 1.11	32.92^{a}± 0.60

values bearing different superscript in a row differ significantly (P< 0.05)

old female Holstein Friesians. Two milliliter of blood samples were collected from Jugular vein in EDTA coated vacutainer tube, out of this 18 samples were from healthy animals and used for hematological analysis on of erythrocyte and leukocyte parameters, thrombocytes or platelets and erythrocytes sedimentation rate using cell counter - blood analyzer Hemavet®. The blood smears were examined under 1000 magnification. The examination was done by erythrocytes calculation until 1000 cells. Identification for detection of erythroparasites percentage (parasitemia) aspec (Azikiwe *et al*., 2012) the degree of infection was classified accordingly as less than 1% (mild), 1-5% (moderate), and more than 5% (severe). Quantitative data was analysed the analysis of variance.

Results and Discussion

The erythroparasite was seen in more than 50 % of the blood samples revealed that they were suffering from erythroparasites (Table I). *Babesia divergen* is the causal agent of babesiosis in Europe and it is a zoonotic disease (Laha *et al*., 2015). *Babesia* sp. and *Anaplasma* sp. (Fig. 1) were observed in 7 slides each and mixed infection in 18 slides. The complete blood counting showed that the erythrocyte mean number in infected dairy cattles were relatively lower than non infected dairy cattles. The decreasing degree of erythrocyte mean number was bigger by concominant infection (AB) of blood parasite rather than by a single infection (A) or (B).

Haemoglobin mean number in infected dairy cattle blood sample (A), (B), (AB) relatively lower than non infected dairy cattles (NC) (Table II). Then, the decreasing degree of haemoglobin content was also lower in concominant infection (AB) of blood parasite rather than by a single infection (A) or (B). There is a strong correlation between the decreasing degree of erythrocyte mean number and haemoglobin content. Generally per cent haemoglobin content in infected dairy cattle blood sample (A), (B), (AB) relatively lower than non infected dairy cattles (NC). The decreasing degree of percent haemoglobin was also lower in concomitant infections (AB) of blood parasite rather than by a single infection (A) or (B). The erythrocyte index analysis is used to predict the type of anemia through their morphology and also by like MCV, MCH, and MCHC (Table II). MCV, MCH, and MCHC mean

Table III. Haematological profile of WBC and its component in dairy cattle blood at KUNAK region, Bogor.

Number of sample (N)	Parasite type	Haematological values of WBC and its component					
		Leukocyte ($x10^3$uL)	Granulocyte (10^9L)	Lymphocyte (10^9L)	Monocyte (10^9L)	Platelet (10^9L)	ESR (mm/hour)
7	*Anaplasma* sp. (A)	$48.31^{c} \pm 68.85$	$38.80^{b} \pm 7.12$	$56.20^{c} \pm 7.56$	$5.00^{a} \pm 3.08$	$412.43^{a} \pm 225.10$	$1.71^{c} \pm 1.45$
7	*Babesia* sp. (B)	$59.33^{d} \pm 89.51$	$44.33^{a} \pm 18.74$	$50.67^{b} \pm 16.68$	$5.00^{a} \pm 2.83$	$436.86^{b} \pm 99.51$	$1.71^{c} \pm 1.25$
18	*Anaplasma* sp.& *Babesia* sp. (AB)	$46.33^{b} \pm 70.77$	$46.14^{a} \pm 13.99$	$48.86^{a} \pm 14.71$	$5.00^{a} \pm 2.29$	$525.00^{c} \pm 379.20$	$1.33^{b} \pm 0.97$
18	Normal Control (NC)	$28.76^{a} \pm 56.71$	$46.18^{a} \pm 13.61$	$49.18^{a} \pm 13.45$	$4.89^{a} \pm 2.66$	$438.67^{b} \pm 180.24$	$1.11^{a} \pm 0.32$

Different superscripts in a column differ significantly

values of infected dairy cattle blood samples showed that (A), (B), & (AB) groups were not significantly differ compared to non infected dairy cattle blood samples hence the anemia type was classified as normocytic normochromic. Anemia type detection can be analyzed by the size of erythrocytes, hematocrit and hemoglobin. Moreover, erythrocyte index was calculated based on mean corpuscular volume (MCV) and mean corpuscular hemoglobin concentration (MCHC) (Harvey, 2001). Mostly infected dairy cattle blood samples showed higher leukocyte mean number than non infected dairy cattle blood samples, indicating secondary bacterial infection. Platelet value of infected dairy cattle blood samples and non infected dairy cattle blood samples did not differ significantly, which may be due to the fact that the parasitic infection was mild and not disturbing the platelet level. The same trend is also observed in the case of ESR values (Table III).

Summary

Clinical and blood sample laboratory examinations, some dairy cattles in Kunak region – Bogor suffered from mild infected by blood parasites (*Anaplasma* sp. and *Babesia* sp.). The changes of dairy cattle haematology profile was influenced by chronic infection of blood parasites.

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