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Profiling of anaplasmosis in dogs from small animal veterinary clinics in Cities of Nueva Ecija, Philippines

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ABSTRACT: This retrospective study analyzed canine anaplasmosis data from 2020 to 2022 collected from eight small animal veterinary clinics across Cabanatuan, Gapan, Muñoz, and San Jose City in Nueva Ecija. The study focused on the distribution of cases based on the dogs' age, sex, breed, the timing of reported cases, and the owners' residence, utilizing Microsoft Excel for data organization. The findings indicate that dogs aged 7-12 months experienced the highest incidence of anaplasmosis at 54.40%. Male dogs showed slightly higher infection rates (49.77%) compared to females (49.39%). Toy breeds were most affected, with a 61.13% infection rate. The most common clinical sign was inappetence, reported in 61.01% of cases. Anaplasmosis cases peaked during the rainy season from June to November, with Cabanatuan recording the highest number of cases (189). The study confirmed significant statistical correlations between anaplasmosis and the animals' age, sex, and breed.

Keywords:
anaplasmosis, profiling, statistical correlation, spatio-temporal

■ INTRODUCTION

Canine anaplasmosis, a significant zoonotic disease worldwide, is primarily caused by *Anaplasma platys* and *Anaplasma phagocytophilum*. *A. platys* targets canine platelets and is transmitted by Rhipicephalus sanguineus (s.l.) ticks, making dogs the main reservoir (Elhamiani Khatat *et al*. 2017). *A. phagocytophilum* is a gram-negative bacterium that infects neutrophils across various hosts and causes granulocytic anaplasmosis in animals and humans (Cohn 2003). Ixode ticks transmit pathogens and commonly result in asymptomatic infections in dogs; however, symptoms such as fever, lethargy, and thrombocytopenia can occur (Carrade *et al*. 2009). Ticks are crucial in the lifecycle and transmission of pathogens (Said *et al*. 2018). Canine anaplasmosis in the Philippines is influenced by environmental factors, vectors, and animal interactions, which necessitates targeted mapping for effective disease management.

■ METHODS

This retrospective study assessed anaplasmosis cases from 2020 to 2023 in four Nueva Ecija cities—Gapan, San Jose, Cabanatuan, and Muñoz–from small animal veterinary clinics. Access to records for research purposes was requested via email. The study included only dogs diagnosed with anaplasmosis by the 3-way (Babesiosis, Ehrlichiosis, and Lyme disease) and 4-way (Lyme disease, Ehrlichiosis, Anaplasmosis, and Heartworm) tests, with data managed in Microsoft Excel. The descriptive analysis focused on sex, breed, clinical signs, age, and vaccination records. Associations between these factors and the incidence of anaplasmosis were evaluated using the chi-squared test of independence, with significant relationships indicated by $P<0.05$.

■ RESULTS AND DISCUSSION

Table 1 indicates that the age group of 7-12 months had the highest rate of Anaplasma infections at 52.40%, contradicting studies by Mohamed El-Dakhly *et al*. (2021), who showed variable susceptibility in older and younger dogs, respectively. Bonilla-Aldana *et al*. (2020) found a higher prevalence in dogs aged < 12 months (28.6%) than in those aged > 12 months (7.8%). Toy breeds, especially Shih Tzus, had the highest infection rate of 61.13%, although Sainz *et al*. (2015) noted that behavioural factors such as outdoor activity might influence this rather than breed-specific predispositions. Clinical symptoms included bloody nose, breathing difficulties, cough, depression, diarrhoea, fever, joint pain, lethargy, pigmenturia, seizures, and vomiting. The data revealed significant correlations with age, predominantly affecting those 7-12 months old, and smaller breeds, such as Shih Tzus, showed higher susceptibility (McMahan 2016). Male dogs also showed higher infection rates, potentially linked to behavioural and outdoor preferences (Mohamed El-Dakhly *et al*. 2021).

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Table 1 Profiling of canine anaplasmosis from Small Animal Veterinary Clinics in Cities of Nueva Ecija, Philippines

Parameters	Details	Freq.; (%)
Age	0-6 months	178; (26.20)
	7-12 months	350; (52.40)
	>12 months	98; (20.31)
	Unknown	30; (1.09)
	p-value	0.001
Sex	Female	317; (49.30)
	Male	327; (49.77)
	Unknown	12; (0.93)
	p-value	0.28
Breeds	Toys	401; (61.13)
	Working dogs	47; (7.17)
	Mongrel	97; (14.79)
	Sporting dogs	10; (1.52)
	Non-sporting dogs	52; (7.93)
	Herding dogs	21; (3.20)
	Terries	5; (0.76)
	Hounds	17; (2.59)
	Unknown	6; (0.91)
	p-value	0.004
Clinical Signs	Bloody nose	114; (17.38)
	Bloody stool	55; (8.38)
	Breathing difficulties	49; (7.47)
	Cough	150; (22.87)
	Depression	66; (10.06)
	Diarrhea	44; (6.71)
	Fever	122; (18.60)
	Inappetence	311; (47.41)
	Joint pain	38; (5.79)
	Lethargy	187; (28.51)
	Pigmenturia	38; (5.79)
	Seizures	114; (17.38)
	Vomiting	132; (20.12)
Seasons	Rainy (Jun-Nov)	301; (45.89)
	Cool-dry (Dec-Feb)	161; (24.54)
	Hot-dry (Mar-May)	194; (29.57)
	p-value	0.005
Year	2020	134; (20.43)
	2021	284; (43.29)
	2022	235; (35.82)
	2023	3; (0.46)
	p-value	0.829

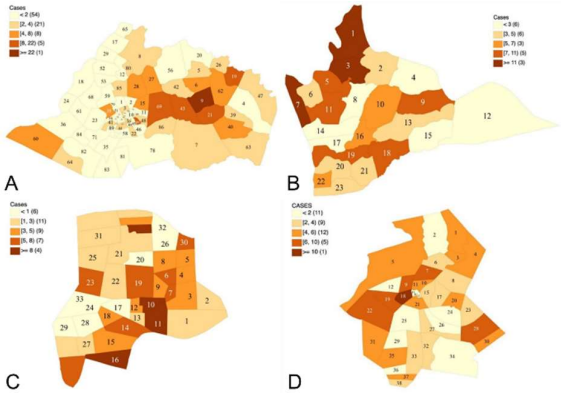

Figure 1 Spatial distribution of anaplasmosis from Small Animal Veterinary Clinics Cities of Nueva Ecija, Philippines. (A) Cabanatuan City, (B) Gapan City, (C) City of Muñoz, (D) San Jose City.

Table 1 and Figure 1A-D show the distribution of Anaplasma infections from 2020 to 2023, with the highest occurrence during the rainy season (June to November), peaking at 301 cases, followed by 161 in the cool, dry season, and 194 in the hot-dry season. Mubashir *et al*. (2022) linked these trends to heightened tick activity due to warmer and wetter conditions, particularly in 2021 and 2022, which mirrors *I. scapularis* tick behaviour in regions such as Minnesota and Wisconsin (Carrade *et al*. 2009). Spatial data from Cabanatuan City highlight Barangay Bangad as having the highest infection rate, followed by Lourdes, Camp Tinio, and Cabu. Additional prevalent areas include Pambuan, San Nicolas, San Lorenzo, Malimba, Mahipon, Bantug, Maligaya, Sapang Kawayan, and Bagong Sikat. Significant rates were noted for Abar 1st, Malasin, and Caanawan in San Jose. These patterns underscore a clear geographic correlation with the incidence of anaplasmosis across Nueva Ecija, Philippines.

■ CONCLUSION

Anaplasmosis is most prevalent in dogs aged 7 to 12 months, primarily affecting males and toy breeds. The condition most commonly associated with infection is inappetence. Cases peak during the rainy season from June to November, with Cabanatuan City recording the highest incidence among the four cities studied in Nueva Ecija, Philippines.

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