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Trichomoniasis as a Factor in Mourning Dove Population Decline in Fillmore, Utah

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ABSTRACT: We examined whether trichomoniasis had been a factor in a dramatic mourning dove (*Zenaida macroura*) population decline in Fillmore, Utah (USA). We reasoned that if we could not find a high proportion of doves showing clinical signs of disease then the population was not being affected. Prevalences of *Trichomonas gallinae* in doves were 21% for 1992 and 14% for 1993. We also examined 230 birds and found only one with oral lesions. These prevalences were similar to those observed at the same study site in the 1950's, or reported elsewhere. Based on our results, we believe that trichomoniasis was not affecting the Fillmore mourning dove population at the time of our study.

Key words: Mourning doves, trichomoniasis, *Trichomonas gallinae*, *Zenaida macroura*.

Kiel (1959) concluded from banding data that North America contains three independent mourning dove (*Zenaida macroura*) populations. As a result of his work, the Western, Central, and Eastern Dove Management units were established by the U.S. Fish and Wildlife Service in 1960 (Tomlinson et al., 1988). Based on data collected annually, there has been a significant downward trend in the mourning dove population during the last 28 yr in the Western Management Unit (Dolton and Kendall, 1993). Reeves et al. (1993) proposed lower productivity, hunting, changes in habitat, effects of pesticides and herbicides, and trichomoniasis, as possible causes of the decline.

Trichomoniasis is caused by a transmissible flagellated protozoan that infects several species of birds, including most of North America Columbiformes. The protozoa, *Trichomonas gallinae*, is present in nearly all rock doves (*Columba livia*) without producing clinical signs of disease (Tudor, 1991). *Trichomonas gallinae* varies

greatly in its relative virulence (Stabler and Herman, 1951) with virulent strains linked to epizootics in mourning doves (Sileo, 1970). Several epizootics involving trichomoniasis have been documented throughout the range of mourning doves (Conti, 1993). The pathogen is spread by direct transmission through the crop milk of infected adults to nestlings (Kietzmann, 1988) or through a common watering site (Kietzmann, 1988).

Prevalences of *Trichomonas gallinae* in mourning doves have ranged from 4% to 58% without observing clinical signs of disease in the population (Straus, 1966; Sileo, 1970; Rupiper and Harmon, 1988); thus, infection and mortality rates are not tightly linked. Similarly, Sileo (1970) reported an epizootic in which the prevalence increased as the rate of morbidity decreased. Infection with nonvirulent strains can result in subsequent resistance to lethal strains (Kocan and Knisley, 1970); however, Sileo (1970) observed that with strains of differing virulence, protective immunity was not evident in all circumstances.

Dahlgren (1955) monitored the mourning dove population in Fillmore, Utah (USA) during 1951 to 1952 and evaluated several factors believed to affect the population, including trichomoniasis. His work provided excellent baseline data for assessing the causes of population change. We repeated Dahlgren's 1952 study in 1992 and 1993. Our counts consistently were below those reported by Dahlgren (1955). Comparing our counts to his, we observed a 72% decline from 1952 to 1992 and an 82% decline from 1952 to 1993. We sought to determine if trichomoniasis was negatively influencing the mourning dove pop-

TABLE 1. Prevalence of *Trichomonas gallinae* in mourning doves from Fillmore, Utah, 1992 and 1993.

	1992	1993	Total
Hatching-year birds			
Sample size	44	36	80
Number infected	13	6	19
Prevalence (%)	30	17	23
Adults			
Sample size	34	41	75
Number infected	3	5	8
Prevalence (%)	9	12	11
All doves			
Sample size	78	77	155
Number infected	16	11	27
Prevalence (%)	21	14	17

ulation. We reasoned that if we could not find a high proportion of doves showing clinical signs of disease then the population was not being affected by trichomoniasis.

From 1 June to 1 September, 1992 and 1993, we captured mourning doves in an agricultural area 2 km northwest of Fillmore, Utah (USA) (38°48'N, 112°21'W). Doves were captured using collapsible funnel traps (Reeves et al., 1968) baited with millet (*Sorghum bicolor*). We orally examined all captured doves for the presence of mouth lesions, an indicator of trichomoniasis (Conti, 1993). Lesions were detectable as raised, yellowish, purulent, independent or confluent, caseous, rough masses on the mucous membranes (Tudor, 1991). We collected mucus samples from trapped birds and cultured them in Diamond's medium that was prepared following methods described by Diamond (1957) and McLoughlin (1966). Categorical data were collected on the presence or absence of infection for adults and hatching-year doves. Two by two contingency tables were used for chi-squared goodness of fit and cross product (odds) ratio analyses (Fienberg, 1989).

We examined 121 birds in 1992; only one had lesions. No lesions were found in the 109 doves examined in 1993. We took 78 oral swabs in 1992 and 77 in 1993; prev-

alences of *Trichomonas gallinae* were 21% for 1992 and 14% for 1993 (Table 1). Prevalences for either hatching-year and adult doves were not significantly different ($P < 0.05$) between years. Prevalences among hatching-year birds compared to adults for the 2 yr were significantly different ($P < 0.05$). Based on the cross product (odds) ratios, hatching-year birds were 2.6 times as likely to be infected as adults.

Dahlgren (1955) examined doves from the same area in 1951 and 1952. He found no doves with oral lesions and concluded that there was no evidence of dove mortality from trichomoniasis. Similarly our results from oral examinations led us to believe that trichomoniasis was not affecting the Fillmore mourning dove population at the time of our study. Our observed frequencies of infection were within the range reported in other studies (Straus, 1966; Sileo, 1970; Rupiper and Harmon, 1988). The higher incidence of infection among hatching-year doves is also consistent with previously reported levels in non-epizootic populations (Straus, 1966; Sileo, 1970; Rupiper and Harmon, 1988). We concluded that trichomoniasis was not contributing to the Fillmore mourning dove population decline.

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