First report of an outbreak trichomoniasis in turkey in Sistan, Iran

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Abstract In June 2010, in small flock of turkeys ($n = 45$) that co-bred with domestic hens ($n = 30$) and pigeons ($n = 35$), a disease occurred with the clinical signs of pendulum crop, in appetite and lumpy wings. Disease had morbidity (10.3 %) and mortality (6/6 %). Three carcasses and two ill turkeys were referred to the Veterinary clinic in Zabol region for diagnosis and treatment of disease. At necropsy, the oral cavity/crop small yellowish-white masses were characterized. Necrosis in mucosal of crop to gizzard increased and in the crop smelly yellowish green secretions were characterized. According to clinical and necropsy, strong suspicion to trichomoniasis was very high so for perfect diagnosing samples were taken from dead and live turkeys. Samples were taken from oral cavity, esophagus and crop mucous membranes indicated *Trichomonas* spp infection. 9 out of 45 pieces of turkey (20 %), 23 out of 35 pieces pigeons (65.7 %) were infected but the domestic hens were not contaminated. The result of this study indicates that trichomoniasis can be an important disease of turkeys in Iran co-bred with pigeons and domestic hens.

Keywords *Trichomonas* · Turkeys · Pigeons · Domestic hens

Introduction

Avian trichomoniasis has been prevalent worldwide since *Trichomonas gallinae* was first identified by Rivolta in

Europe in 1878. *T. gallinae* is an economically important pathogen, since it affects avian livestock and wild pigeons, doves, owls, turkeys, pheasants, canaries, ducks, ostrich, Budgerigar and quails, but rarely reported in aquatic birds and avian predators (hawks and eagles) (Cover et al. 1994; Erwin et al. 2000; McKeon et al. 1997; Ponce Gordo et al. 2002; Saif et al. 2003; Samour and Naldo 2003). Pigeons are often associated with transmission of trichomoniasis to turkeys and chickens. Nearly all pigeons are carriers of this organism apparently because of existence of numerous strains. Transmission of infection between birds is most likely to be by birds feeding one another with regurgitated food during the breeding season or through food or drinking water contaminated from an infected bird (Saif et al. 2003). The common name for the disease in pigeons and doves is “Canker” and in birds of prey the disease is also known as “Frounce” (Saif et al. 2003). Parasites live mainly in the bird’s anterior digestive tract, where they can cause granulomatous lesions that occlude the oesophagic lumen, leading to the death of birds as a result of severe starvation (Narcisi et al. 1991). In young birds, the infection is severe and even fatal where mortality can reach up to 80–90 % or more in squabs (Soulsby 1982). However, it is well known that virulence of the strains varies and some can reach parenchymatous organs and generate necrotic foci (Narcisi et al. 1991). Pigeons however are more susceptible to secondary organ invasion (liver, air sacs, lung, and brain) by virulent strains of the parasite. Necrotic lesions develop in these organs leading to the death of the host. Therefore, this research was conducted to determine the Presence of *T. gallinae* and pathological effect of infection on turkeys and pigeons in Sistan region of Iran.

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Materials and methods

Study area

This study was carried out in Sistan region in the east of Iran during June 2010. Sistan is located in the east of Iran and north of Sistan va Baluchestan province, between pivot 30 and 18 min till 31 and 20 min in the northern region and 61 and 10 min till 61 and 50 min in the eastern region. The height of Sistan in average is between 475 and 500 m from the sea, and Zabol is the center of Sistan with the height of ~487 m up the sea. Sistan, from the north and east, is a neighbor of Afghanistan and is limited from the west and northwest to the dry deserts. The average temperature is maximum at 22–49 and minimum at –8, which has been reported for a 20 year period. The average annual rain in Sistan is reported at around 59 mm and the average humidity at ~40 % (Khammar et al. 2011).

In this study samples were taken from 110 birds from a flock. Samples collected from the oral cavity, oesophagus and crop, for detection of *T. gallinae*. At the first a cotton swab was fluffed up a bit and immersed in distilled water. The excess fluid was removed and the swab was inserted into the oral cavity, oesophagus and crop. All walls of the crop was contacted by using a swirling motion with the swab which was then withdrawn and the fluid hold in the cotton pressed onto a slide with the help of a spatula or blunt knife. The protozoon was seen to move about in a somewhat jerky wobbling motion observing immediately under light microscope.

Collected samples were preserved and stained by the Giemsa's method as described by Cable (1957) and morphology was studied (Abraham and Honigberg 1964) (Fig. 1).

Result

At the end of the study, *T. gallinae* was found in 32 out of the 110 pieces analysed. The birds were under a year to over 2 years old, from 45 studied turkeys 9 Pieces (20 %) and from 35 pigeons 23 Pieces (65.7 %) had been infected with *T. gallinae* but the domestic hens have not been infected (Table 1). In infected pigeons and turkey, yellowish-white masses of caseous necrotic material were seen grossly in the oral cavity, esophagus, crop, and proventriculus (Figs. 2, 3). Pale to yellow necrotic areas were noted in the liver. Multiple foci of caseous necrosis were seen microscopically in the oral mucosa together with heavy infiltration of inflammatory cells.

In all pigeons and turkey, the treatment was performed by adding 30 mL of metronidazole solution to 1 L of drinking water in period 5 days. After 7–10 days the

Fig. 1 *Trichomonas gallinae* stained with Giemsa's stain

absence of all clinical disturbances was reported. Consequently, the elimination of *T. gallinae* in sampling again.

Discussion

As the results showed, *T. gallinae* was found in 32 out of the 110 pieces analysed but the domestic hens were not infected. The present study is apparently the first report of the occurrence of a *Trichomonas* in the upper digestive tract of turkey and pigeons in the southeast of Iran. In previous studies in Iran, Borji et al. (2011) reported 37.32 % infection with trichomoniasis in affected pigeons of Khorasan province (Borji et al. 2011). In other report from Ahvaz, Iran, Mayahi et al. (2007) studied trichomoniasis in pigeons and domestic hens and detected *Trichomonas* from affected pigeons, but domestic hens not infected with *T. gallinae* (Mayahi et al. 2007). Similar to the present study *T. gallinae* was the most commonly in affected pigeons.

During this study (June 2010) 65.7 % pigeons were infected with *T. gallinae* which supported the findings of Begum et al. (2008), De Carli et al. (1979) and McKeont et al. (1997), who recorded 67.3, 62.3 and 59.0 % prevalence of *T. gallinae* in pigeons in Bangladesh, Brazil and Australia, respectively (Begum et al. 2008; De Carli et al. 1979; McKeon et al. 1997). But, the present finding is found higher prevalent rate than that of Villanua et al. (2006), Tasca and De Carli (1999) and Toro et al. (1999), who reported 34.2, 26.5 and 11 % *T. gallinae* infection in pigeon in Spain, Brazil and Chile, respectively (Tasca and De Carli 1999; Toro et al. 1999; Villanua et al. 2006). Anderson et al. (2009) recorded a prevalence rate of trichomoniasis of 1.7 % in house finches, 0–6.3 % in corvids and 0.9 % in mockingbirds (Anderson et al. 2009).

Table 1 Rate of infection of *Trichomonas gallinae* in pigeons, turkey and domestic hens

Kind of bird	Inspected	Infected	Uninfected
Turkeys	45	9 (20 %)	36 (80 %)
Pigeons	35	23 (65.7 %)	12 (34.3 %)
Domestic hens	30	0 (0 %)	30 (100 %)
Total	110	32 (29.9 %)	78 (70.1)

Fig. 2 Pendulum crop turkey affected by *Trichomonas gallinae* **Fig. 3** Yellowish to grayish necrotic lesions in the oral cavity

Krone et al. (2005) reported that the prevalence of trichomoniasis in northern goshawks from the Berlin area of northeastern Germany was 69.7 % in 1998, 73.0 % in 1999, 55.8 % in 2000 and 62.9 % in 2001 (Krone et al. 2005). The variation of the prevalence rate in the various studies is expectable in view of the many factors that affect occurrence of the disease such as the climatic conditions, geographical difference, seasonal variation, resistance of the host, different feeding habits, age of birds, difference in housing conditions, etc. Although outbreaks can occur at any time of the year, most authors agree that spring and summer are ideal for transmission, since they coincide with the highest reproduction rate of pigeons (Gerhold et al. 2007).

This study showed that infection with *T. gallinae* in turkeys and pigeons flock is probably that co-bred in one place, unsanitary equipment and kennels and keeping them with together. Risk factors leading to transfer and establish the disease, need further investigation to improve the management practice and to avoid infection in pigeons and turkeys.

In the present paper we have described for the first time the co-existence of *T. gallinae* in turkeys and pigeons in this area.

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