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Strigea falconispalumbi in Eurasian Buzzards from Germany

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ABSTRACT: Eighty-three free-living Eurasian buzzards (*Buteo buteo*) from three different areas in Germany were examined for adult stages and the metacercaria of the trematode *Strigea falconispalumbi.* Prevalences of adult parasites in the small intestine was 36% (Berlin/Brandenburg), 28% (Lower Saxony) and 3% (Baden-Württemberg). Metacercaria in the connective tissue of the neck were found in 58%, 55%, and 10% of birds from the respective areas. Significant differences in the prevalence of *S. falconispalumbi* adults and metacercaria between the areas were attributed to the different abundance of freshwater which is the key habitat for two intermediate hosts.

Key words: Buteo buteo, epizootiology, Eurasian buzzard, geographic distribution, *Strigea falconispalumbi,* survey.

The Eurasian buzzard (*Buteo buteo*) is the most common raptor in Germany (Bauer and Berthold, 1996). Their diet consists mainly of small mammals, birds, amphibians, reptiles, and insects; they occupy habitats as diverse as forests and open country (Glutz von Blotzheim et al., 1971).

The life cycle of *Strigea falconispalumbi* consisting of a first intermediate host of aquatic snails a second intermediate host of tadpoles, frogs or toads and a third intermediate host of many kinds of vertebrates including amphibians, reptiles, birds, and mammals (Odening, 1967). Because the third intermediate host range is very broad, *S. falconispalumbi* is found in various falconiform birds in the Holarctic region (Dubois, 1968). Birds of prey may be parasitized by the adult stages of the parasite when they feed metacercaria in the third intermediate host. Alternatively, if the bird feeds on the second intermediate host containing the mesocercaria, the parasite will develop to the metacercaria stage in the bird. This study aimed to investigate the prevalence of adult stages and metacercaria of *S. falconispalumbi* in the Eurasian buzzard in different areas of Germany.

Birds sampled in this study were collected 1995–96 in Lower Saxony (LS) (52°00′ to 53°00′N, 9°50′ to 11°00′E), Berlin/Brandenburg (BB) (52°00′ to 53°25′N, 11°50′ to 14°50′E), and Baden-Württemberg (BW) (47°50′ to 49°25′N, 8°50′ to 9°75′E). Eighty-three Eurasian buzzards were examined for prevalence and mean intensity of *S. falconispalumbi*; there were 23 adult, 16 immature, and three subadult male, 21 adult, 17 immature, and one subadult female. Of these, 29 were collected in LS, 25 in BB, and 29 in BW. Seventy-seven Eurasian buzzards were examined for metacercaria consisting of 29 birds from LS, 19 from BB, and 29 from BW; mean intensities were calculated for 16 birds.

Of the birds we examined 80% died or were euthanatized because of trauma (mainly caused by traffic accidents), 8% died due to diseases, 4% due to electrocution, and 7% of no determined cases. During necropsy the digestive tract and the connective tissue of the neck were examined for parasites following Doster and Goater (1997). Trematodes were cleaned and immediately fixed in Bouin's solution for at least 24 hr, stained with alum-carmine solution (Reichenow et al., 1969), and mounted in Canada balsam. Trematodes were identified by using the keys supplied by Dubois (1968) and Skrjabin (1959).

Fisher's exact test was used to compare prevalences for two areas and chi-square test for more than two areas (Sokal and Rohlf, 1997). A Bonferroni adjustment was performed in case of pairwise simultaneous comparisons (Sokal and Rohlf, 1997). We calculated 95% confidence intervals for prevalences as measurement of uncertainty (Altman, 1991). Standard errors (SE) were assigned to the mean intensities.

Prevalences of adult parasites in the small intestine of Eurasian buzzards were 36% (confidence interval = 18–58) in BB (n = 25), 28% (13–47) in LS (n = 29) and 3% (0–18) in BW (n = 29). Metacercaria in the connective tissue of the neck were in 58% (34–76) in BB (n = 19), 55% (36–74) in LS (n = 29) and 10% (2–27) in BW (n = 29). There was a significant difference in prevalence of adults (n = 83, P = 0.009) and metacercaria (n = 77, $P < 0.001$; chi-square test) between the three study areas. Pairwise comparisons (Fisher's exact test with Bonferroni adjustment for three simultaneous tests) revealed differences between BW and NS (*S. falconispalumbi:* n = 58, P = 0.013; metacercaria: n = 58, $P < 0.001$), BW and BB (*S. falconispalumbi:* n = 54, P = 0.003; metacercaria: n = 48, $P < 0.005$), but not between BB and NS (*S. falconispalumbi:* n = 54, P = 0.355; metacercaria: n = 48, P = 0.727). Mean intensity for *S. falconispalumbi* in infected Eurasian buzzards from BB (n = 25) was 70.1 ± 27.9 (±SE) and from LS (n = 29) 69.1 ± 31.3. One Eurasian buzzard from BB (n = 29) was infected with seven strigeids. The mean intensity for metacercaria in Eurasian buzzards from BB (n = 8) was 58.5 ± 30.9, from LS (n = 5) 9.6 ± 2.9 and from BW (n = 3) 11.6 ± 4.4. An association between infections with metacercaria and adult stages of *S. falconispalumbi* in Eurasian buzzards was found (Fisher's exact test, n = 77, P = 0.004).

Van Riper et al. (1986) and Zelmer et al. (1999) have demonstrated that the natural nidus of a disease can be associated with a definite geographical landscape that promotes coincidental distributions of hosts. Sousa and Grosholz (1991) described a variety of habitat-related biotic and abiotic factors which influence the rate of transmission of parasites. The most probable cause for the differences in the infection with *S. falconispalumbi* in the Eurasian buzzards between the study areas is the difference in the abundance of freshwater, which is the key habitat for less mobile hosts such as aquatic snails (first intermediate host) and amphibians (second intermediate host). BW has the lowest proportion of freshwater surface (0.6%) compared to LS (1.5%) and BB (2.0%). Thus, a parasite with a complex life-cycle can indicate other habitat requirements than those required by the definitive host.

Strigea falconispalumbi is the most often diagnosed trematode in birds of prey in Europe. Only adult stages living in the intestine are diagnosed. A prevalence of 5% was found in Eurasian buzzards from the Lublin (Poland) examined by Furmaga (1957). Kutzer et al. (1980) found it to be the only trematode in *B. buteo, Accipiter gentilis,* and *Falco tinnunculus* from Austria. As the dominant species in *B. buteo* from the Czech Republic this trematode was found with a prevalence of 27% (Sitko, 1998). Our results revealed lower (<5%) and higher (>27%) prevalences of this parasite in the Eurasian buzzard in three different areas of Germany than described in other regions of Europe. This leads to the conclusion that looking for the prevalence of a parasite it is important to consider the habitat type together with the geographic location. Our results also indicate that the Eurasian buzzard frequently harbour the infective metacercaria and can therefore act as the third intermediate host if a falconiform bird is feeding on an infected Eurasian buzzard.

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