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are responsible for producing central nervous disturbances, often of a profound nature. However, in the present instance, based on the fact that there appeared to be minimal tissue reaction, and that the moose seemed healthy when shot by the hunters, deleterious effects of *T. ovis krabbei* in the brain were minimal. The fact that it was seen in moose collected in three different areas in the state suggests that it is of fairly common occurrence. Unfortunately, it was not possible to correlate the finding of the brain cysticerci with the occurrence of muscle cysticerci in the hosts examined.

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Helminth Fauna of Ring-Necked Pheasants from the Texas High Plains[1]

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Presently there is limited information on the helminth fauna of ring-necked pheasants (*Phasianus colchicus* Gmelin) in the Texas High Plains. Pence et al. (1980, Proc. Helminthol. Soc. Wash. 47: 144–147) reported one trematode, one cestode, and two nematode species in seven of 78 (9%) pheasants from the Texas Panhandle. These authors noted a basic similarity in the helminth fauna of pheasants from the Texas Panhandle with that of pheasants in Nebraska, but noted a much lower prevalence and intensity of helminth species from the Texas birds. Since the above study was based entirely on hunter-killed, cock pheasants collected during the fall from a single area, the present study was initiated to further examine the helminth fauna of this host as related to age, sex, season, and geographic area.

Eighty-four pheasants were collected in February, May, August, and November 1981 from Deaf Smith, Castro, and Parmer Counties (Area 1) and Hale County (Area 2), Texas. The two areas were chosen because of differences in pheasant density (Dowell and Warren, 1982, Proc. Annu. Conf. Southeast. Assoc. Fish Wildl. Agencies 36: In press). Pheasants were collected with shotguns and consisted of 35 males and 49 females. There were 24 juveniles and 60 adults. Fifty and 34 birds were collected from Areas 1 and 2, respectively. Necropsy procedures and collection methods for identification of helminths followed the method of Pence et al. (1980, op. cit.). Representative specimens of helminths have been deposited in the U.S. National Parasite Collection, Beltsville, Maryland (Accession Nos. 77253–77255). The terms prevalence, intensity, and abundance follow the definitions of Margolis et al. (1982, J. Parasitol. 68: 131–133). The Mann-Whitney *U*-test statistic for data with ties (Conover, 1980, Practical Nonparametric Statistics, 2nd Ed., John Wiley and Sons, New York, 493 pp.) was used to determine significant differences ($P < 0.05$ unless otherwise indicated) in helminth prevalence and abundance between areas, ages (adult vs. juvenile), sexes, and seasons (warm vs. cool).

Helminths were recovered from 18 of 84 (21%) birds examined. There were no hosts infected with more than one helminth species. Fifteen of 84 (18%) pheasants were infected with *Choanotaenia infundibulum* (Bloch, 1779). Intensities ranged from 1 to 25 ($\bar{x} = 5.3$) and the abundance value was 0.980 for this

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TABLE 1. Monthly prevalence, intensity, and abundance of *Choanotaenia infundibulum* in ring-necked pheasants from the Texas High Plains.

Collection period	Prevalence		Intensity		Abundance
	No. infected/ no. examined	%	Range	Mean	Total no. parasites no. examined
Feb	2/25	8.0	1	1	0.08
May	7/16	43.7	1–25	5.4	2.40
Aug	6/23	26.1	1–22	6.5	1.70
Nov	0/20	0.0	0	0	0.00

species. A single specimen of *Heterakis* spp. was recovered from each of three pheasants: *H. gallinarum* (Schrank, 1788), *H. isoloncbe* (Linstow, 1906), and a specimen of *Heterakis* that could not be identified because of poor condition. Prevalence and abundance of *Heterakis* spp. were 1.2% and 0.012, respectively. Pence et al. (1980, op. cit.) found *H. gallinarum*, *Oxyspirura petrowi* (Skrjabin, 1929), *C. infundibulum*, and *Echinoparyphium recurvatum* (Linstow, 1873) in pheasants from the Texas High Plains. Thus, *H. isolonche* is a new record for pheasants in this region.

There were no significant differences in helminth prevalence and abundance between sexes, areas, or ages. Gilbertson and Hugghins (1964, J. Wildl. Manage. 28: 543–546) reported a greater prevalence of helminths (primarily *H. gallinarum*) in adult than juvenile pheasants from South Dakota.

The prevalence and abundance of *C. infundibulum* was significantly greater ($P < 0.01$) in warmer months (May and August) than in cooler months (February and November) (Table 1). *Choanotaenia infundibulum* has an indirect life cycle (Gilbertson and Hugghins, 1964, op. cit.), which may result in seasonal differences in infections. Horsefall and Jones (1937, J. Parasitol. 23: 435–450) found that the lowest temperature range in which the cysticercoid would develop to the infective stage within the intermediate hosts, beetles and grasshoppers, was 15.5–23.8 C for a minimum of 49 days and 23.8–37.2 C for 17–20 days, respectively. Thus, the warm season seems to be the time that the infective stage of *C. infundibulum* would occur in a bird. Pence et al. (1980, op. cit.) collected birds only in the fall, which could explain the lower prevalence (3 of 78, 3.8%) of *C. infundibulum* they found, as compared to the 18% overall prevalence in our study. Gilbertson and Hugghins (1964, op. cit.) also found lower prevalence of *C. infundibulum* in the cooler seasons. They speculated that longevity of the species lasts only 3–4 mo. Two individuals of *C. infundibulum* were found during February in our study, so perhaps the longevity is greater than 3–4 mo, although these birds could have been infected in late summer or fall, which would account for the time differences.

Pence et al. (1980, op. cit.) found only three of 78 (3.8%) pheasants infected with *H. gallinarum* in hunter-killed birds in the Texas High Plains. Our study also documented a very low prevalence of this helminth. Clapham (1961, J. Helminthol., R. T. Leiper Suppl.: 35–40) found that 304 of 3,830 (7.9%) pheasants in the United Kingdom were infected with *H. isolonche*. Of these, 148 had ulcerative typhlitis which was judged to be severe enough to cause death. Twenty-three additional birds had typhlitis of an unknown origin, though a few adult *H. gallinarum* or *H. isolonche* were found. It should be noted that all of the birds examined in that study were collected either dead or dying. Considering the rarity of this species in pheasants from the Texas High Plains, the potential for an epizootic caused by this species is negligible.

Our study substantiates the previous study by Pence et al. (1980, op. cit.) regarding the paucity of helminth fauna in ring-necked pheasants from the Texas High Plains. *Choanotaenia infundibulum* is the only species for which prevalence and abundance levels are sufficiently high to be considered a naturally occurring species in this host from this region. Secondly, of the various host and environmental parameters examined, the abundance of *C. infundibulum* appears to be affected only by seasonality. The second conclusion reaffirms the importance of conducting parasitological studies over the entire year, rather than at one specific time.