lymph vessels, yet Yamaguti (1970) in redescribing this species stated that these vessels were actually excretory tubes and that no true lymphatic system was present. He also stated that Siddiqi and Cable (1960) concurred with this interpretation in their description of *Hapladena acanthuri* but I cannot find such a statement in their report. In fact they described *H. acanthuri* as having two pairs of longitudinal lymphatic vessels. Montgomery (1957) could have counted one pair of excretory tubes as lymphatic.

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Helminth Parasites of the American Coot, *Fulica americana americana*, on Its Winter Range in Florida[1]

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ABSTRACT: Seventeen species of helminths were found in 60 coots, *Fulica americana americana*, from six localities in Florida. These included eight species of trematodes, two species of cestodes, six species of nematodes, and one species of acanthocephalan. Thirteen of the 17 species appear to be common parasites of the coot and the rest accidental parasites acquired on the winter range. The helminth fauna of the coot in Florida appears to be reduced in comparison to that reported on its summer range. The fauna of the coot shows a close relationship to that of the common gallinule (*Gallinula chloropus cachinnans*) found in the same habitats.

The American coot, *Fulica americana americana* Gmelin, winters throughout the southern United States from California to the Atlantic Coast (Ryder, 1963). In Florida, the coot occurs as an abundant winter resident in all parts of the state, and breeds only sporadically in small numbers in the summer (Howell, 1932). Migrating coots arrive in Florida in November and leave in April. In order to compare the helminths of wintering coots with those found in coots from their summer range in Alberta by Colbo (1965), 60 birds were

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collected in Florida in the winters of 1970–71 and 1971–72.

Materials and Methods

Most birds were collected by shotgun; a few were found dead on roads from collisions with wires or automobiles. All birds were collected in the months of November through March, with the majority falling in December and January. Areas sampled were Lake Alice, Paynes Prairie, Orange Lake, and Lake Lochloosa, Alachua Co.; Johnson Pond, Marion Co.; and Backwater Lake, Citrus Co. A few birds were examined while still fresh, but most were frozen and examined at a later date. Necropsy methods and treatment of worms were the same as those outlined by Kinsella and Forrester (1972). Nasal sinuses and subcutaneous tissues were not examined.

Results and Discussion

Seventeen species of helminths were recovered from the 60 coots. Only one bird was free of helminths. These included eight species of trematodes, two species of cestodes, six species of nematodes, and one species of acanthocephalan (Table 1). *Conspicuum icteridorum*, *Hystrichis tricolor*, and *Capillaria* sp. have not been previously recorded from the coot.

A species of *Strongyloides* commonly found here in the coot closely resembles the *Strongyloides* sp. found by Kinsella, Hon, and Reed (1973) in the common gallinule, *Gallinula chloropus cachinnans*, and the purple gallinule, *Porphyrula martinica*. *Strongyloides avium* Cram, 1929, was reported from the coot by Cram (1930) and Colbo (1965). However, in light of the high incidence of infection found in the two species of gallinules and in the Florida duck by Kinsella and Forrester (1972), species identification of *Strongyloides* in these waterfowl has been deferred pending further studies on life cycles and host specificity.

In an extensive study of the helminths of 371 coots on their summer breeding grounds in northern Alberta, Colbo (1965) found 36 species of worms (including one leech). The coot was classified as the main host of 14 species and an auxiliary host of four species, these categories corresponding roughly to the "normal" and "secondary" host categories of Dogiel (1966). The remaining 18 species were classified as accidental parasites of the coot.

Table 1. Helminths of 60 American coots (*Fulica americana americana*) in Florida.

	No. infected	No. of worms	
		Mean	(Range)
Trematoda			
Notocotylus pacifer (Noble, 1933) (4)[1]	55	18	(1–250)
Echinostoma attenuatum Lumsden and Zischke, 1963 (3)	17	3	(1– 9)
Cyclocoelum mutabile (Zeder, 1800) (7)	15	5	(1– 26)
Cyclocoelum oculeum Kossack, 1911 (7, 8)	5	2	(1– 3)
Leucochloridium problematicum Magath, 1920 (5)	4	17	(1– 55)
Tanaisia atra (Nezlobinski, 1926) (6)	2	1	(1)
Prosthogonimus ovatus (Rudolphi, 1803) (5)	2	1	(1)
Conspicuum icteridorum Denton and Byrd, 1951 (9)	1	1	(1)
Cestoda			
Diorchis ransomi Schulz, 1940 (3)	14	6	(1– 50)
Diorchis americana Ransom, 1909 (3)	11	10	(1– 50)
Nematoda			
Amidostomum fulicae (Rudolphi, 1819) (2)	50	10	(1– 30)
Tetrameres globosa (Linstow, 1879) (1)	40	4	(1– 21)
Strongyloides sp. (3)	36	12	(1–137)
Capillaria fulicae (Pavlov and Borgarenko, 1959) (4)	14	4	(1– 19)
Hystrichis tricolor Dujardin, 1845 (1)	2	1	(1)
Capillaria sp. (2)	2	1	(1)
Acanthocephala			
Polymorphus trochus Van Cleave, 1945 (3)	17	7	(1– 30)

[1] Location in host: (1) proventriculus, (2) under gizzard lining, (3) small intestine, (4) ceca, (5) cloaca, (6) kidneys, (7) air sacs, (8) trachea, (9) liver.

The helminth fauna of the coot on its winter range appears to be greatly reduced in comparison to its fauna on the summer range. However, of the 14 species classified by Colbo as normal coot parasites, 12 were present in Florida. Although the coot was classified by Colbo as an auxiliary host of *Strongyloides avium* Cram, 1929, the present study indicates that *Strongyloides* is a common parasite in coots. The remaining four species, *Prosthogonimus ovatus*, *Conspicuum icteridorum*, *Hystrichis tricolor*, and *Capillaria* sp., were not found by Colbo and appear to be accidental parasites which the coot picks up during migration or on its winter range.

The common gallinule and the purple gallinule, two rallids of comparable size and habits to the coot, occur with coots in winter. Comparison with a study of the helminths of these two species by Kinsella et al. (1973) shows that the coot shares 10 species of helminths with the common gallinule and eight with the purple gallinule. Incidence and intensity of infections indicate a closer ecological relationship between the coot and common gallinule than between either of these species and the purple gallinule.

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Immunosuppressive Activity of Azathioprine in Experimental Infection of the Guinea Pig with *Trichinella spiralis*[1]

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ABSTRACT: Experiments were conducted in guinea pigs to compare the number of adult *Trichinella spiralis* recovered from the intestine and larvae from skeletal muscle in control and azathioprine-treated animals. Azathioprine suppressed the delayed (cellular) hypersensitivity response and allowed significantly ($P < 0.01$) more adults to remain in the intestine. There was no significant difference ($P > 0.10$) in the number of muscle larvae in azathioprine-treated guinea pigs as compared to controls. These results suggest that the immunologic responses operating in guinea pigs are similar to those operating in mice and rats.

Guinea pigs infected with *Trichinella spiralis* characteristically expel the majority of adult worms from the intestine during the second week of the initial infection (Roth, 1939). Evidence indicates that this expulsion is due to delayed (cellular) hypersensitivity (Kim, 1966; Larsh, 1967; Cypess et al., 1971). This "spontaneous cure" (Mulligan, 1968) has been suppressed in hamsters with 6-mercaptopurine, methotrexate, and cortisone (Ritterson, 1959, 1968); and in mice with cortisone (Coker, 1955) and antilymphocytic serum (DiNetta et al., 1972). These immunosuppressive compounds suppressed the "spontaneous cure" phenomenon and thus prolonged the duration

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