BioOne COMPLETE

PUBLIC HEALTH AND THE URBAN GRAY SQUIRREL: MYCOLOGY

Authors: LEWIS, ETHEL, HOFF, GERALD L., BIGLER, WILLIAM J., and JEFFERIES, MILDRED B.

Source: Journal of Wildlife Diseases, 11(4) : 502-504

Published By: Wildlife Disease Association

URL: https://doi.org/10.7589/0090-3558-11.4.502

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Complete content is strictly limited to personal, educational, and non - commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

Downloaded From: https://bioone.org/journals/Journal-of-Wildlife-Diseases on 29 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

PUBLIC HEALTH AND THE URBAN GRAY SQUIRREL: MYCOLOGY

ETHEL LEWIS, GERALD L. HOFF, WILLIAM J. BIGLER and MILDRED B. JEFFERIES,
Bureaus of Preventable Diseases and Laboratories, Division of Health, Department of Health and Rehabilitative Services, State of Florida, P.O. Box 210, Jacksonville, Florida 32201, USA[1]

Abstract: From 180 gray squirrels (*Sciurus c. carolinesis*), 942 isolates of fungi representing 19 genera were recovered upon culture of hair-skin scrapings and toenails. Of the isolates, 170 represented known human pathogens and 142, squirrel pathogens. A human infection of *Trichophyton mentagrophytes* was derived from handling the squirrels. Skin lesions of seven squirrels were attributable to *T. mentagrophytes* and *Mucor* sp.

INTRODUCTION

While outbreaks of disease among urban wildlife species may or may not have public health significance, they are generally noted by the public and occasionally documented by investigators.[3-5,7] Regrettably, few studies have attempted to define the diseases of the various species of urban wildlife, especially those diseases which have potential for transmission to humans or their pets. The complexity of such studies naturally varies with the resources and interests of the investigators. During the calendar year 1974, the Veterinary Public Health Section of the Florida Division of Health (FDH) with the support of various FDH Bureaus, the University of Florida, the University of Georgia and the Florida Department of Agriculture and Consumer Services, conducted a multifaceted investigation into the health and diseases of the urban gray squirrel, *Sciurus c. carolinesis.* The study was conducted in the City of Jacksonville (pop. 574,000) in north-east Florida and the results of the mycological investigations are presented in this report.

MATERIALS AND METHODS

Jacksonville (2200 km^2; 456 km^2 urbanized) was trisected into areas of approximately equal size. Within each area, 12 collection sites were selected. One collection site per area was sampled every month during 1974, with five squirrels being live-trapped at each site. Squirrels were captured in cage-type traps baited with peanut butter and pecans. The animals were from residential areas (15 sites), parks (11 sites), cemeteries (4 sites), school grounds (4 sites) and on commercial property (2 sites). The animals were transported to the FDH for examination and processing.

Squirrels were anesthetized with ketamine hydrochloride and exsanguinated. Hair and skin scrapings were obtained from the muzzle and body of each squirrel, with particular attention paid to skin lesions. In addition, at least two toenails from each foot were collected. A different set of sterile instruments was used for each animal. The scrapings from each squirrel were pooled, placed between two sterile glass slides and the edges sealed with tape. Toenails were placed in sterile screw-capped glass vials.

[1] Reprint requests: Veterinary Public Health Section, Division of Health, Department of Health and Rehabilitative Services, State of Florida, P.O. Box 210, Jacksonville, Florida, 32201, USA.

Downloaded From: https://bioone.org/journals/Journal-of-Wildlife-Diseases on 29 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

Scrapings and toenails were pressed gently into slants of sabourard-dextrose agar, pH 5.6, and Mycosel agar, pH 7.0. Cultures were incubated at 25 C for 4-6 weeks, and observed for growth every 4 days. Subcultures were made when necessary to prevent overgrowth by saprophytic species. Identification of isolates was based upon development and morphology of the colonies and on microscopic characteristics.[2,8]

RESULTS

Of the 180 squirrels examined, 73 were males and 107 were females. Using a modification of Fisher and Perry's[6] eye-lens weight curve for gray squirrels, we determined that 144 (80%) of the squirrels were less than 2 years of age.

Fungi were isolated from all but one squirrel. There were 942 isolants representing 19 genera (Table 1). Of the isolates, 170 (18%) represented known human pathogens and 142 (15%) were recognized squirrel pathogens. Nine squirrels had noticeable skin lesions and *Trichophyton mentagrophytes* was isolated from six; *Mucor* sp. was isolated from one. Known squirrel pathogens were not isolated from the other two animals. In addition, one of the authors acquired a *T. mentagrophytes* infection from handling squirrels.

TABLE 1. Fungal isolates from 180 gray squirrels, Jacksonville, Fla. 1974.[1]

Fungus	No. Isolates	
	Scrapings	Toenails
Alternaria sp.	82	45
Aspergillus glaucus[2]	3	5
Aspergillus niger[2]	29	20
Aspergillus sp.	60	28
Candida albicans[2]	0	2
Candida tropicalis	5	4
Cladosporium sp.	114	57
Curvularia sp.	2	0
Fusarium sp.[2]	1	3
Helmenthrosparium sp.	13	3
Microsporum gypseum[2]	1	8
Mucor sp.[3]	50	53
Nigrospora sp.	1	1
Oospora sp.	5	3
Paecilomyces sp.	2	0
Penicillium sp.	133	97
Rizopus sp.	1	0
Scopulariopsis brevicaulis[2]	7	52
Streptomyces sp.	4	0
Trichoderma sp.	4	4
Trichophyton mentagrophytes[2] [3]	26	13
Trichothecium sp.	1	0
Total Isolates	544	398

[1] Isolations not made from 18 specimens (1 scraping; 17 nails).
[2] Isolations are potentially pathogenic for humans.
[3] Isolates are potentially pathogenic for squirrels.

Downloaded From: https://bioone.org/journals/Journal-of-Wildlife-Diseases on 29 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

Seasonal patterns of isolation were not noted for any of the fungi, except *Aspergillus glaucus,* which was recovered only between July and December. Relationships could not be established between fungi isolated and the age, sex or habitat of squirrels.

DISCUSSION

From a public health viewpoint, 114 (63%) of the squirrels were carrying fungi potentially pathogenic for humans. Of the 7 genera encountered, four would have the greatest potential for transmission to humans via scratches or from handling squirrels: *C. albicans, M. gypseum, S. brevicaulis* and *T. mentagrophytes.* How readily these fungi can be transmitted from squirrels to humans is unknown and the amount of direct human contact with squirrels can only be estimated. Approximately 380 squirrels (mostly gray) are examined annually by FDH for rabies and probably represent only a small portion of those squirrels having intimate contact with humans. An additional 1,505,000 gray squirrels are estimated to be harvested annually by Florida hunters. Assuming 63% of the hunter-killed animals carry fungi pathogenic for man, then 948,200 represent potential sources of human mycotic disease. Most likely, infections acquired from squirrels would be superficial and self-limiting, thereby not coming to the attention of FDH. However, in this study and in a study by DeLamater,[4] human infections with *T. mentagrophytes* were derived from handling gray squirrels.

Only two genera of the fungi are recognized as pathogenic for the squirrel: *Mucor* sp. and *T. mentagrophytes.*[1,5,9] These fungi were recovered from 107 (59%) of the squirrels; however skin lesions attributable to fungi were observed on only seven animals. None of these lesions were extensive and generally were confined to the hindquarters and legs.

LITERATURE CITED

1. AINSWORTH, G. C. and P. K. C. AUSTWICK. 1959. Fungal Diseases of Animals. Rev. No. 6 Commonwealth Agricultural Bureaux, Farnham Royal, England 148 pp.
2. AJELLO, L., L. K. GEORG, W. KAPLAN and L. KAUFMAN. 1966. Laboratory Manual for Medical Mycology. U.S. Public Health Service Publication No. 994. U.S. Govern. Printing Office, Wash., D.C.
3. BIGLER, W. J., R. G. McLEAN and H. A. TREVINO. 1973. Epizootiologic aspects of raccoon rabies in Florida. J. Epidemiol. 98: 326-335.
4. CLEERE, R. L. and C. S. MOLLOHAN. 1968. Follow-up plague—Denver, Colorado. NCDC MMWR 17(28): 261-262.
5. DeLAMATER, E. D. 1939. The squirrel as a new host to a ringworm fungus. Mycologia 31: 519-526.
6. FISHER, E. W. and A. E. PERRY. 1970. Estimating ages of gray squirrels by lens-weights. J. Wildl. Manage. 34: 825-828.
7. HOFF, G. L., W. J. BIGLER, S. J. PROCTOR and L. P. STALLINGS. 1974. Epizootic of canine distemper virus infection among urban raccoons and gray foxes. J. Wildl. Dis. 10: 423-428.
8. REBELL, G., D. TAPLIN and H. BLANK. 1964. Dermatophytes: Their Recognition and Identification. Dermatology Foundation of Miami, Miami, FL 58 pp.
9. SAUER, R. M. 1966. Cutaneous mucormycosis (phycomycosis) in a squirrel (*Sciurus carolinensis*). Am. J. vet. Res. 27: 380-383.

Received for publication 14 April 1975

Downloaded From: https://bioone.org/journals/Journal-of-Wildlife-Diseases on 29 Mar 2024
Terms of Use: https://bioone.org/terms-of-use