strains showed a striking increase in virulence, and produced a variety of disease states depending upon the method in which they were administered. Cell suspensions from pools of infected liver and kidneys, passed by intraperitoneal inoculation, produced in neonates an acute, fulminant illness (*2*) characterized by a hemorrhagic enteritis and severe wasting, terminating fatally within 7 to 10 days. When infected brain tissue was administered to neonates by intracerebral injection, a severe form of ataxia appeared within 12 days. These animals were stunted, emaciated, exhibited teeth deformities, and died within 3 to 4 weeks, probably from systemic spread of rat virus. With the enhancement of virulence, it became almost impossible to induce a chronic ataxia because of the failure of the affected animals to survive.

Subsequent studies have demonstrated the production of cerebellar ataxia by five strains of rat virus of diverse origins. These include (i) rat 12 and rat 13 strains isolated from Fisher rats bearing spontaneous hepatic sarcomas (*1*), (ii) the 171 and 312 strains isolated, respectively, from Osborne-Mendel and Sprague-Dawley rats infected with the Moloney leukemia virus (*6*), and (iii) the L.S. strain from Wistar rats bearing a transplantable chloroleukemia (*8*).

Evidence for the serologic relationship of the various strains of rat virus to the original strain (rat 12), has been shown (*6, 8*). The neutralization tests performed on suckling hamsters by intracerebral inoculation show (Table 1) that rat-virus-immune serum, from an inoculated hamster, neutralized the capacity of three different strains of rat virus to induce ataxia (*2*).

Failure in the past to recognize cerebellar ataxia as a manifestation of experimental rat virus infection can be accounted for by the fact that the restricted host-parasite relationship necessary for the production of this disease state had not previously been met. For ataxia to develop, the following are prerequisite: (i) the use of virus freshly isolated or maintained by passage in tissue culture rather than virus with virulence enhanced by previous animal passages; (ii) the intracerebral route of inoculation; and (iii) the use of newborn hamsters, in which there is a receptive bed of germinal tissue exposed to the virus.

The ability of rat virus to attack selectively the actively proliferating germinal layer of the neonatal cerebellum is in keeping with the known property of this virus to grow preferentially in tumor-bearing rats and pregnant hamsters (*1, 4, 6, 8*). Just as with irradiation (*9*) and antimitotic agents (*10*), it appears that the target of the rat virus is the dividing cell. This predilection for growing tissues may furnish a clue to the pathogenesis of the mongoloid dwarfism (*3*) and the tooth dysplasia (*4*) produced in hamsters by rat virus.

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Inquiline Roach Responds to Trail-Marking Substance of Leaf-Cutting Ants

Abstract. *Nymphs and females of the roach inquiline,* Attaphila fungicola *W. M. Wheeler, respond to odor-trail substances of* Atta texana *(Buckley) and* Trachymyrmex septentrionalis *(McCook). The ants are more sensitive than roaches to the pheromone.*

Attaphila fungicola W. M. Wheeler is a small, wingless roach that inhabits the fungus gardens of most nests of the Texas leaf-cutting ant or town ant, *Atta texana* (Buckley). It is one of the few inquilines that live intimately with the ant.

Table 1. Response to odor-trail substances of *Atta texana* and *Trachymyrmex septentrionalis* by their workers and females of *Attaphila fungicola*. The response is the number of insects following circular trail 15 cm or more, and is the sum of two replications of ten insects each.

Test insects	Dilution of contents from one poison sac in 1 ml of CCl_4			
	1	10	10^2	10^3
Major worker *Atta texana**				
A. texana (mw)†	20	19	12	0
A. fungicola (♀)	20	18	0	0
Minor worker *Atta texana*‡				
A. texana (mw)	20	12	0	0
A. fungicola (♀)	16	0	0	0
Worker *Trachymyrmex septentrionalis*§				
T. septentrionalis	20	14	0	0
A. texana (mw)	16	10	0	0
A. fungicola (♀)	16	2	0	0

*Body length, 10.0 mm; poison sac, 0.9 by 0.65 mm. †Minor workers, mw; ‡Body length, 3.5 mm; poison sac, 0.2 by 0.2 mm. §Body length, 3.0 mm; poison sac, 0.2 by 0.2 mm.

Numerous publications describe inquilines on ant trails, but in no case is it clear that they follow the ant scent.

The bioassay technique described by Moser and Blum (*1*) was used to measure the response of the roach to trail-marking substances from the poison sac of *Atta texana* and a related ant, *Trachymyrmex septentrionalis* (McCook). Each poison sac was crushed in 1 ml of carbon tetrachloride; the solution was shaken thoroughly and 0.1 ml was applied to a sheet of paper in a narrow line, describing a circle 15 cm in diameter. Roaches were then placed inside the circle and records made of the number that followed the line for 15 cm or more. To determine the lowest concentration that roaches and ants could detect, similar trials were made with serial dilutions. Female roaches only were used since the male roach has never been found in central Louisiana. The roach specimens were taken from nests of town ants.

The trail-marking substances from the two species of ants were less attractive to the roach than to the ants, but the response of the roach to contents of sacs of equal size from ants

of either species was the same (Table 1). Ants and the roach could better detect the odor-trail substance from major than from minor workers of *Atta texana*, evidently because sacs of major workers contained more pheromone.

Roach nymphs of ages 3 weeks, 3 months, and 11 months (growth to sexual maturity takes about 12 months) followed artificial trails as well as did mature females. Five roaches that did not respond to the substance in laboratory tests were *Periplaneta americana* (Linn.), *P. fuliginosa* (Serv.), *Blattella germanica* (Linn.), *Supella supellectilium* (Serv.), and *Parcoblotta* sp.

In the laboratory, the antennae of *Attaphila* moved vigorously but never touched the artificial trail. However, the maxillary palps, which are almost as long as the antennae, were in constant contact with the trail.

The roach has not been found in field nests of *Trachymyrmex*, which are abundant and often superimposed on the larger nests of *Atta*. In the laboratory, roaches survive well in nests of both ants but workers of *Trachymyrmex* are somewhat hostile.

Attaphila fungicola has never been observed on field trails of the town ant, though Bolivar (*2*) recorded *Attaphila schuppi* Wasm. on trails with workers of *Acromyrmex* prob. *niger* (F. Smith) in Brazil. Some individuals of *A. fungicola* placed on field trails followed scent but took about 15 minutes to become adjusted.

Although the roach may not use field trails as a mechanism of dispersal, the pheromone may assure continued association of the insects. It may explain why roaches are often found riding on town ant queens during mating flights.

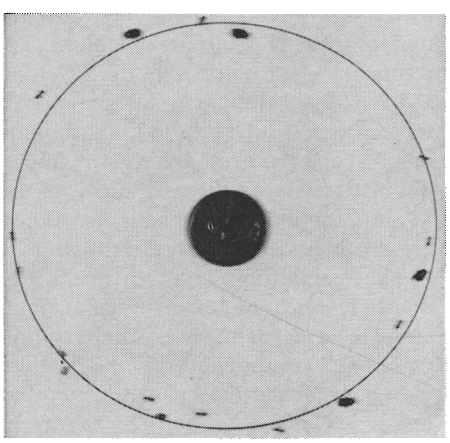

Fig 1. First-instar nymphs and female adults of roach, and minor workers of town ant following artificial trail. Note that insects travel in both directions.

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Humoral Thymic Factor in Mice: Further Evidence

Abstract. *Mice of the C3H and DBA strains thymectomized at birth showed a consistent and striking suppression of antibody production (hemolysin response) to sheep erythrocytes. When cell-tight Millipore diffusion chambers containing syngeneic thymic tissue were implanted intraperitoneally, the capacity of these neonatally thymectomized mice to respond to this antigen was restored. The pattern of response and the mean titer were similar to the pattern and mean titer observed in neonatally thymectomized mice bearing subcutaneous grafts of syngeneic thymic tissue. These data are consistent with the concept that thymic tissue within the chamber produced a specific diffusible factor that enabled the thymectomized animal to establish immunologic competence.*

Thymectomy in mice performed within 24 hours of birth usually leads to a syndrome characterized by a gradual deterioration in physical condition evidenced by progressive weight loss, cachexia and lethargy, ruffled fur, diarrhea, and—terminally—a severe depletion of small lymphocytes in lymphoid organs and blood (*1–3*). The onset and extent of "wasting" and depletion varies with the strain of mouse.

Impaired immunological competence has also been observed. This has been demonstrated by skin homografts (*1, 4*), by grafts of foreign cells (*2, 5, 6*), both normal and neoplastic, and by primary stimulation with several antigens, notably sheep erythrocytes, *Salmonella H* antigen, killed influenza virus, and bovine serum albumin (*5, 7, 8*).

The thymus is an active site of lymphopoiesis in the newborn mouse and it is probably wholly responsible for the production and delivery of immunologically competent lymphocytes early in life.

One important role of the thymus in establishing and maintaining the integrity of the lymphoid system is mediated through a diffusible factor. Neonatally thymectomized C3H/Lw mice implanted with cell-tight Millipore diffusion chambers containing syngeneic (isologous) thymic tissue did not show depletion of lymphocytes in the blood, involution of lymphoid organs, or characteristic signs of the "wasting" syndrome (*3*). Also, neonatally thymectomized mice, bearing diffusion chambers with thymic tissue, regained the capacity to reject skin homografts (*9*). Further confirmation of the action of a humoral mechanism of the thymus was obtained through studies of the response of NIH Swiss mice to lymphocytic choriomeningitis (LCM) virus. Thymectomized mice were protected from the lethal effects of virus; those implanted with cell-tight Millipore diffusion chambers containing newborn thymic tissue had their susceptibility restored to the lethality of LCM infection (*10*).

This study was undertaken to obtain further evidence for a diffusible factor or factors in the thymus. Since neonatally thymectomized mice showed a regular and pronounced suppression of sheep erythrocyte hemolysin response, antibody production (hemolysin response) of neonatally thymectomized mice was compared with the response in neonatally thymectomized littermates in which a Millipore diffusion chamber containing syngeneic thymus was implanted intraperitoneally or in which syngeneic thymus tissue was implanted subcutaneously.

Two inbred strains of mice were used, C3Hf/Lw and DBAf/2Lw. Newborn animals were thymectomized under ether anesthesia within 12 to 18 hours of birth by a technique adapted from Miller (*11*). Two mice in each litter served as controls; these were either sham-operated or intact. Sham operations were included in the first of three groups of C3H mice but were discontinued when no differences were found between these and intact mice.

Animals were killed and autopsied at 6 to 10 weeks of age. Completeness of thymectomy was checked by inspection, and serial sections of suspected thymic tissue in the anterior mediastinum were made. Those few mice with thymic remnants will be discussed specifically.

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