

NOTES ON THE TERMITES OF INDIANA—II.<sup>1</sup>

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In 1920<sup>3</sup>, the writer reported for the first time the occurrence of *Reticulitermes virginicus* Banks in Indiana. He also called attention to the fact that careful collections should reveal the presence of another species, *R. hageni* Banks in this state. Life history notes and data on the economic importance of the only previously recorded species in Indiana, *R. flavipes* Kollar, were also presented. At that time nothing was known about the distribution and economic importance of *R. virginicus* in this state.

Since 1920, twenty cases of termites' damage have been investigated by the writer in response to requests received by the Division of Entomology of the State Department of Conservation for help in eliminating these pests. Of these, eleven were *R. flavipes*, eight were *R. virginicus* and one was *R. tibialis*, a new record for Indiana.

**Distribution.**—To the known distribution of *R. flavipes* in Indiana the following localities were added: Morgantown, Richmond, Switz City, and Terre Haute.

*R. virginicus* has only been found in Indianapolis.

The only record of *R. tibialis* is from the southwest corner of Gibson County, four miles north of Poseyville. From published records<sup>4</sup> this species seems to be a western one, the nearest point to Indiana recorded being Iowa City, Iowa.

**Swarming.**—The records of the swarming of *R. flavipes* during 1921 and 1922 followed those recorded in 1920 very closely, ranging from April 9 to May 15.

All specimens of winged colonizing adults of *R. virginicus* have been obtained between March 16 and April 8, 1922. In all cases the swarms occurred in buildings and were therefore independent of out-of-door conditions.

No specimens of fall swarms of either *R. flavipes* or *R. virginicus* have been obtained and several cases of such swarms that were investigated in 1922 proved to be the swarming of true ants. However, in the case of one dwelling infested with *R. virginicus* the owner reported that swarming took place early in October in 1921.

The one and only record of *R. tibialis* was winged adults obtained on November 3, 1922, from the crowns of strawberry plants, previously tunnelled by the workers. Whether swarming took place prior to or after this date could not be learned.

damage were reported to the Division of Entomology and investigated by the writer. In 1922, fifteen cases were reported and visited. In some

**Termite Injury.**—During the year 1921 only five cases of termite

<sup>1</sup> Presented at the 1922 meeting.

<sup>2</sup> Published with the permission of the Chief of the Division of Entomology and the Director of the Department of Conservation of Indiana.

<sup>3</sup> Notes on the Termites of Indiana. Proc. Ind. Acad. Sci., 1920, pp. 87-96 (1921).

<sup>4</sup> A Revision of the Nearctic Termites with Notes on Biology and Geographic Distribution. Banks, N., and Snyder, T. E. Bul. 108, U. S. Natl. Mus. (Feb. 15, 1920).

cases extensive damage was done. Since termites often work several years unobserved in a building, it is improper to credit all damage done to a single year.

At Richmond and Morgantown certain neighborhoods were found where extensive damage was done to all surrounding wooden structures that were so constructed as to invite attack. By this is meant wood construction either in direct contact with the ground or very close to the ground. This was particularly true at Richmond where two adjacent dwellings were set not more than a foot from the ground. Besides these dwellings all fences, sheds and grape arbors were badly damaged by *R. flavipes*. Not only were the wooden structures attacked, but the heart wood of a large cherry tree and the centers of a dozen thirty-year-old grape vines were also eaten out. Besides, tunnels were occasionally made through the living wood to the surface of infested plants where the characteristic covered runways were constructed over the bark. On the cherry tree some of these runways were a foot and more in length, reminding one in a small way of the runways of certain tropical species of the genus *Nasutitermes* which build runways over the surface of high trees from the ground to the tops. Conditions such as these indicate the presence of a large central nest somewhere in the vicinity from which the insects work. At Morgantown in several localities somewhat similar conditions were found.

The most interesting case of injury by *R. flavipes* not only from an economic aspect but also from a biological one was found at Indianapolis July 12, 1922. A carpenter was repairing a dwelling over fifty years old in one of the older parts of the city and found that the termites had worked through the decomposing mortar between the bricks into oak plates made of twelve by twelve inch "fitches." Here they had constructed an accessory nest from which the writer obtained twenty brachypterous or second form queens in less than a half hour. Millions of eggs and young in all stages of development were also found. I was informed that at least twice as many of these queens had been destroyed before I visited this place.

*R. virginicus* is equally as important as *R. flavipes* when it comes to damaging buildings. In the northern and eastern residential sections of Indianapolis serious damage to dwellings was done in 1922 by the former species. Repairs that were necessary amounted to as high as fifteen hundred dollars in at least two cases. Some very poor types of construction were revealed such as plastered wall partitions built directly to the ground with cement floors around these walls. In this case it would have been just as easy and just as cheap, and at the same time would have been a protection against termites, to have had such walls constructed to rest on the cement floors. In another instance, in a very costly residence, the tile floor of the sun parlor was laid on one foot of cinders supported by a wooden floor. In turn in the basement some of the supports and joists on which the wooden floor was laid came in direct contact with wooden construction and ran into the ground. When this poor type of construction was removed to replace it with concrete it was found that in many places the wooden floor and joists had been

badly damaged by the termites and it would have been only a matter of time until this part of the house would have collapsed.

*R. virginicus* has revealed an interesting fact about the use of hollow concrete blocks in building foundations. The use of such foundations as they are now generally built lays the wooden plate and other wooden construction open to termite attack as readily as if these parts were in direct contact with the ground. The reason is that these insects build their runways from the ground up to the plate on the hollow insides of the blocks. Here the insects can work unmolested for it is impossible to shut them off from the wood without extensive tearing out and putting in either solid concrete blocks or a layer of bricks laid in cement between the ground line and the plate. It is much easier to do this in the process of building the foundation than after the house has been damaged.

The conditions under which *R. tibialis* was found indicate that if it is widely distributed in Indiana it too will be a species of considerable economic importance. It was found tunnelling "mother" strawberry plants in an area of about one acre in a twenty acre field. Over this area three years previously pea hulls had been piled and rotted and it is probable that the insects had been working in this pile. The region north of Poseyville where it was found was a sandy, level, almost treeless area, with apparently nothing for termites to feed on except living cultivated plants, fence posts and wooden buildings.

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