

# Journal of the Arkansas Academy of Science

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Volume 5

Article 7

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1952

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### Recommended Citation

Causey, David (1952) "Terrestrial Isopoda of Arkansas," *Journal of the Arkansas Academy of Science*: Vol. 5 , Article 7.  
Available at: <http://scholarworks.uark.edu/jaas/vol5/iss1/7>

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## THE TERRESTRIAL ISOPODA OF ARKANSAS\*

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## 1. Introduction

The Isopoda are an interesting and readily available example of one division of the higher crustacea. After the caridoid facies became established in the early Malacostraca, two divergent trends arose. In the Eucarida, e.g., the shrimp, crawfish, and crab, the trend included the elaboration of the carapace into a myriad pattern of forms, sculpturing, and coloring, along with the emphasis on stalked eyes and the carrying of the eggs by the female on her abdominal appendages. In the Peracarida, on the other hand, there is a progressive reduction of the carapace until in the higher members of the group-- the Amphipoda and the Isopoda-- it has been lost; and the presence of sessile eyes and the carrying of the eggs and young by the female in a brood chamber formed by inward extensions of the thoracic appendages are characteristic.

True to the general nature of the class to which they belong, the Isopoda have shown great powers of exploiting the environmental opportunities. They are fundamentally marine and littoral, but have radiated out in many directions. Many are the "cockroaches" of the seashore, cleaning up whatever organic matter comes their way. Still more have become parasitic upon a variety of hosts, especially other crustaceans and fish. Some, including gigantic forms nearly a foot long, are found on the bottom of the deeper sea. Many have invaded the freshwaters, and a relatively few have become terrestrial. These, "the insects of the crustacean world" (Hatch), have established a relatively feeble hold upon the habitat, but where favorable niches offer the right moisture conditions and food, they thrive in numbers sufficient to attract attention and to receive common names. "Their color has caused them to be likened to little asses, and their crowding together to little pigs" (Hatch) and their small size and activities have suggested lice, hence such names as *Asellus*, sow bug, and wood louse. Other names are pig louse, "millipede," and "pill-millipede." Slater, because of the color of many is appropriate but not widely used. In Arkansas they seem to be referred to as sow bug, pill bug, and certain kinds are called roly-polly bugs. Some 21 terrestrial species occur in North America, 14 species from the Middle Atlantic States (New York to Virginia), 9 species in Connecticut, 19 from the Pacific North West (Hatch), and 10 from Michigan (Hatchett). This paper reports 9 species from Arkansas.

The literature on the Isopoda is relatively enormous. The standard reference for American forms is Harriet Richardson's A Monograph on the Isopods of North America (1905). The most comprehensive later work is Van Name's The American Land and Fresh-water Isopod Crustacea (1936) with two supplements. Of the shorter works, Hatch, The Chelifera and Isopoda of Washington and Adjacent Regions (1947), and Hatchett, The Biology of the Isopoda of Michigan (1947) are recent and excellent. Little mention of Arkansas isopods occurs in the literature. Fitch (1855) reported *Porcellio immaculatus* (now *Porcellionides pruinosus*) from Arkansas, and this is repeated in Underwood's (1886) check list. One infers the presence of a few species in Arkansas from such statements as southern United States, etc.

## 2. Life History

Little is known as to the general biology of the American terrestrial isopods. Hatchett's Michigan studies are the most recent and thorough and are freely paraphrased in the following. The female is called gravid when carrying eggs, embryos, or young in the brood pouch (marsupium). This period is variable -- for four different species of as many genera Hatchett reports averages of 39, 43, 43.5, and 52 days. Also variable is the number of broods per year, commonly one, often two, and occasionally three. He reports from 10 to 70 in a brood for one species.

\*Research Paper No. 1034 Journal Series. University of Arkansas.

The young commonly leave the brood pouch at the anterior end or slip between the gaps in the oostegites. In emergencies, as when the mother is being disturbed, she may discharge them herself. The young usually have the first molt within 24 hours after leaving the mother, and the second occurs within the first two weeks. Most have a third molt in the third week. The majority molt a fourth time within the fifth week. Hatchett found that from there on the young tended to molt every two weeks until they were about 20 weeks old. After this, the molting is irregular, and dependent upon the food supply. The isopods probably average two years of life, with a few reported to have lived for five years. No such data are available at present for the Arkansas species. The only study of a nearby area appears to be that of Pierce (1907) upon *A. vulgare* near Dallas, Texas.

### 3. Economic Importance

The terrestrial isopods are found in damp places where they live on the decaying organic material, largely plant, which is available. Under some circumstances, where moisture and food are abundant, they increase in numbers to an extent which attracts attention and may be annoying, either from an esthetic viewpoint for those who don't like crawling forms of life, or from being somewhat of a nuisance, such as being crushed under foot and so being messy. In the south they sometimes damage growing plants such as cotton and the common garden vegetables. Ornamental plants such as violets and rhododendron seedlings are sometimes attacked. In greenhouses they often are both a nuisance and a source of damage to plants. Dusting with arsenates or the use of poisoned baits are recommended.

Probably due to the famous doctrine of signatures in materia medica, *Armadillidium vulgare*, a very common old world form which rolls up and looks like a large pill, has been used either dried and powdered or as a wine of millipedes in medicine for various ailments. Fitch (1855) reported that they had been dropped from the pharmacopaeias, but Bate and Westwood (1868) mention that "they are still taken medicinally in some parts of Somersetshire." In my childhood a half dozen or so sewed in a little cloth bag and suspended about a child's neck was a sure preventative for the croup. So far as I can recall it was as effective as wearing a lead nickel in the same way to prevent nose bleed!

### 4. Distribution of Species

Bate and Westwood (1868) reported that "Of fourteen species described by Professor Kinahan in his memoir on this family ... he states that all, except two (one a marine species), had been found by him in a garden not sixty yards square, and nearly all in abundance." This is certainly not true for Arkansas. During our collecting trips the past several years we have rarely found isopods, although looking in sites-- under and in logs and under rocks-- where we expected to find them. Many trips during which numerous millipedes and earthworms were found failed to turn up a single isopod. In Arkansas *A. vulgare* is commonest in the vicinity of habitations, and is common in compost heaps, basements and in damp areas (e.g. under boards or rocks) in yards. This species occurs in the ivy on our house foundation and on the fireplace chimney which is ivy covered from the ground to the top.

The majority of the collections were made by Dr. Nell Bevel Causey and the author. Graduate students who have brought specimens include Miss Ruth Steuart, Clarksville, and Mr. Newton R. Pillstrom, Altus. Professor Walter Harman, of Louisiana Polytechnic Institution, Ruston, La. has sent me a number of specimens from El Dorado. I express my thanks to all of these.

The following data are admittedly incomplete, for with only limited time for collecting, and that highly seasonable, there are areas from which I have no specimens. Most of the data apply to the western half of the state; the northwestern portion has been most thoroughly examined. Efforts to collect isopods in the north eastern quarter of the state have been fruitless thus far, and no opportunity to collect in the south eastern quarter of the state has occurred.

#### *Armadillidium nasatum*:

Fayetteville, Washington County. Widespread over the area, but apparently less common than *A. vulgare*, with which it often occurs. Very scanty data suggest the ratio of *A. nasatum* to *A. vulgare* is about 1:5 in the Fayetteville area.

Mt. Magazine, Logan County.

*Armadillidium vulgare*:

Altus, Franklin County.  
 Blue Springs, Carroll County.  
 Camp Chaffee, Ft. Smith, Sebastian County.  
 Cave Springs, Benton County.  
 Clarksville, Johnson County.  
 El Dorado, Union County.  
 Fayetteville, Washington County.  
 King's River, Carroll County.  
 Lake Leatherwood, Carroll County.  
 Monte Ne, Benton County.  
 Pine Bluff, Jefferson County.  
 Texarkana, Miller County.

This, the commonest species in Arkansas, according to present data, is common around buildings and in greenhouses.

*Ligidium longicaudatum*:

Cave Springs, Benton County.  
 Monte Ne, Benton County.  
 Mt. Magazine, Logan County.

This species is the only Arkansas form which appears to be native American rather than introduced (cf. however, *T. demivirgo*). It does not appear to be common and the records are from areas with little or no man-made changes. While one suspects that this form is unable to withstand competition with the introduced old world forms, no good evidence in favor of this is available.

*Oniscus asellus*:

Clarksville, Johnson County.  
 El Dorado, Union County.  
 Fayetteville, Kessler Mt., Washington County.  
 This species tends to be associated with yards and gardens.

*Porcellio scaber*:

Blue Springs, Carroll County.  
 Cain Hill, Washington County.  
 Fayetteville, Washington County.  
 Lake Leatherwood, Carroll County.  
 Stamps, Miller County.  
 This species may be found in basements, and in yards.

*Porcellio spinicornis*:

Fayetteville, Washington County, including Kessler Mt.  
 This occurs around houses and on nearby hillsides.

*Porcellionides pruinosus*:

El Dorado, Union County.  
 Fayetteville, Kessler Mt., Washington County.  
 Greenwood, Sebastian County.  
 This species is associated with houses and nearby hillsides.

*Trachelipus* (= *Tracheoniscus*) *rathkei*:

Fayetteville, Washington County.  
 King's River, Carroll County.  
 This appears to occur away from houses and yards, and on hillsides. It has been found with *A. vulgare*.

*Trichoniscus demivirgo*:

Beaver, Carroll County.  
 Monte Ne, Benton County.  
 West Fork, south of, Washington County.

This is to be found associated with punky wood in old logs. It is the smallest of our terrestrial isopods, with only females known to occur in the United States, and if regarded as distinct from the related European species, is another native species.

## 5. Key to the Terrestrial Isopods (Oniscoidea) of Arkansas (after Hatchett).

This is a conventional dichotomous key in which the user is always presented with a choice of two statements, one of which must be true (one hopes!). If a statement is not true, the one referred to by the figure in parentheses is the alternative. The key applies only to adult specimens. The plate illustrates the characteristics used and the numbers are the same as those of the key.

- 1 (2) First pair of antennae plainly visible and at least one-fourth as long as second pair of antennae; posterior segments of abdomen fused.  
Freshwater Isopoda (not considered in this key).
- 2 (1) First pair of antennae inconspicuous, rudimentary and not one-fourth as long as second pair; abdominal segments not fused.  
Terrestrial Isopoda.....3
- 3 (6) Uropods not extending beyond the terminal segment of the abdomen..... 4
- 4 (5) Head with a small V-shaped notch at front end\*.....  
*Armadillidium nasatum*
- 5 (4) Head without such a notch.....  
*Armadillidium vulgare*
- 6 (3) Uropods extending beyond the terminal segment of abdomen 7
- 7 (10) Flagella of antennae (actually the second pair because the first are rudimentary) of 4 to many segments..... 8
- 8 (9) Flagella of antennae of 4 or 5 segments.....  
*Trichoniscus demivirgo*
- 9 (8) Flagella of antennae with more than 5 segments.....  
*Ligidium longicaudatum*
- 10 (7) Flagella of antennae with either 2 or 3 segments..... 11
- 11 (12) Flagella of antennae with 3 segments.....  
*Oniscus asellus*.
- 12 (11) Flagella of antennae with 2 segments..... 13
- 13 (14) Abdomen abruptly narrower than thorax; antennae conspicuously banded with white at joints.....  
*Porcellionides pruinosus*
- 14 (13) Abdomen and antennae not so..... 15
- 15 (16) Dorsal surface of head rough, but not conspicuously tuberculated.....  
*Trachelipus (= Tracheoniscus) rathkei*
- 16 (15) Dorsal surface of head with many conspicuous tubercles.. 17
- 17 (18) Dorsal surface of body conspicuously tuberculated.....  
*Porcellio scaber*.
- 18 (17) Dorsal surface of body not conspicuously tuberculated...  
*Porcellio spinicornis*.

\*"The large, squarish, forwardly extending lobe into which the epistome is produced distinguished this species from *A. vulgare*." (Van Name).

## 6. Summary

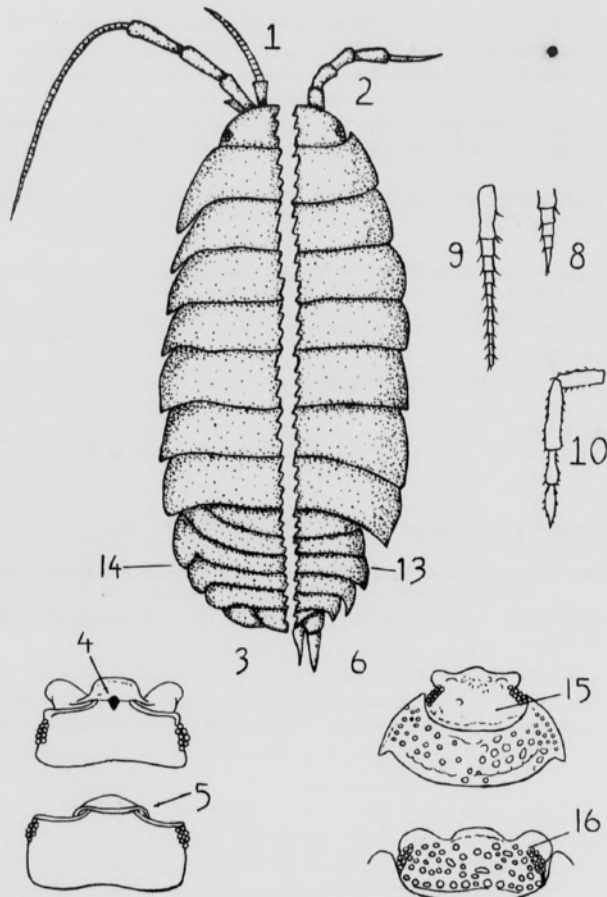
Nine species of terrestrial isopods are listed from Arkansas: *Armadillidium nasatum*, *A. vulgare*, *Ligidium longicaudatum*, *Oniscus asellus*, *Porcellio scaber*, *P. spinicornis*, *Porcellionides pruinosus*, *Trachelipus (= Tracheoniscus) rathkei*, and *Trichoniscus demivirgo*. Their presently known distribution and a key for their identification are given.

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## Explanation of Plate

The plate illustrates the characteristics used in the key. Figures with which numerals 4, 5, 15 and 16 are associated are redrawn from Hatch, and 8, 9, and 10 are redrawn from Hatchett. The large diagram of an isopod is a composite of the characteristics indicated.

- Fig. 1. The two pairs of antennae characteristic of the aquatic isopoda.
- Fig. 2. The readily seen pair of antennae, actually the second pair.
- Fig. 3. Uropods not extending beyond the body contour of the terminal abdominal segment.
- Fig. 4. Illustrating the small V-shaped notch and the squarish protruding epistome on the head of *A. nasatum*.
- Fig. 5. Illustrating the absence of the V-shaped notch and squarish lobe.
- Fig. 6. Uropods extending beyond the terminal segment of the abdomen.
- Fig. 7. Use figure 9.
- Fig. 8. Showing antenna with 4 segments to the flagellum.
- Fig. 9. Showing antenna with more than 5 segments to the flagellum.
- Fig. 10. Showing antenna with 2 segments on flagellum.
- Fig. 11. Use fig. 10, but imagine the flagellum with 3 segments!
- Fig. 12. Use fig. 10.
- Fig. 13. Showing abdomen abruptly narrower than thorax.
- Fig. 14. Showing abdomen not abruptly narrower than thorax.
- Fig. 15. Showing dorsal surface of head rough but not conspicuously tuberculated.
- Fig. 16. Showing dorsal surface of head conspicuously tuberculated.