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DEPARTMENT OF BIOLOGY

September 12, 1986

Mr. Carl N. Becker, Section Manager
Division of Natural Heritage
Illinois Department of Conservation
Lincoln Tower Plaza
524 So. Second Street
Springfield, Illinois 62701

Dear Carl:

Enclosed is a report on the Native Earthworm Survey carried out this summer. I hope you find it interesting and informative.

I am also enclosing an invoice for services rendered.

Sincerely yours,

Bob Betz

ROBERT F. BETZ
Professor of Biology

Report on

NATIVE EARTHWORM SURVEY

by

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During the course of this survey, worms were collected by digging in five different counties in northeastern Illinois (Dupage, Kane, Kankakee, Kendal and Iroquois) on over 60 sites. These sites included a variety of ecological communities, such as, flood plains of streams, verges of roads, old and cultivated fields, etc. and almost all of the worms collected were of Eurasian origin (Allolobophora trapezoides, A. chlorotica, Eisenia rosea, Lumbricus rubellus and Octolasium tyrteum).

The native earthworm, Diplocardia communis, or prairie worm, was found along an inner meander of a flood plain on Mud Creek southwest of Milford in southern Iroquois county. The site extended approximately five to ten acres and was covered with a rather unusual savanna grassland of Elymus virginicus (Virginia wild rye). Forbs associated with this floodplain grassland (possibly virgin) were Allium canadense (wild onion), Aster praealtus (willow aster), Polygonum amphibium stipulaceum (water knotweed), Ranunculus abortivus (small-flowered buttercup), Ruellia strepens (smooth ruellia), Rumex altissimus (pale dock) and Silphium perfoliatum (cup plant). A few trees of Carya ovata (shagbark hickory) and Fraxinus pennsylvanica subintegerrima (green ash) and a shrub Cephalanthus occidentalis (buttonbush) were scattered throughout this savanna grassland. A few weeds, such as, Amaranthus retroflexus (rough amaranth) Poa pratensis (Kentucky bluegrass) and Rumex crispus (curly dock) were also present.

A few immature earthworms which could not be positively identified and which may have been Diplocardia communis, were seen on the flood plain of Spring Creek northeast of Onarga in Iroquois county. Elymus virginicus was also the dominant grass on this small flood plain.

Diplocardia communis is a long thin worm about 200 mm (8 inches) in length. It is a rather attractive earthworm with a pale whitish to pale pink color and has a golden saddle-shaped clitellum between the 13th and 18th segments. When the earthworm is probing it shows a characteristic narrow snoot which is not usually present in Eurasian worms, and under certain conditions exudes a yellowish secretion from all parts of their skin. They are very fragile and easily broken when being extracted from clumpy soil; in contrast to most Eurasian worms which can withstand a certain amount of tugging and pulling without breaking into two.

About three dozen Diplocardia worms were collected and placed in clear plastic sweater boxes along with the soil in which they were found (Zook silty clay) for further study. After three months in captivity they still appear well and content. One fact noticed with these captive worms is their sensitivity to moisture. Only a slight diminution of soil moisture causes them to collect in a ball, cover themselves with slime and go into a partial quiescent state. With the addition of water they again scatter themselves throughout the soil and renew feeding.

The soil under this Virginia wild rye grassland is classified as a Zook silty clay (#402), which is a

> "nearly level, poorly drained soil found on flood plains and in some drainage ways extending into the uplands. It is frequently flooded for brief periods from March through June. Individual areas are irregular in shape and range from three to several hundred acres in size. Typically, the surface layer is black, firm silty clay about 7 inches thick. The subsurface layer is about 11 inches of firm black silty clay and silty clay loam. The subsoil is mottled firm silty clay and about 35 inches thick.....The seasonal high water table is within a depth of 2 feet.....It is used for pasture land and hay, and only moderately used for cultivation." (Kiefer, L.M., et al.; 1982).

Most of this flood plain on which the Diplocardia worm was found, was an ungrazed pasture surrounded by an electric fence. The plain extended beyond the fence and across the dirt road to a plowed field, which was also part of the flood plain. The worm was found on both sides of the road, which was also covered with a Virginia wild rye grassland, but the earthworm was abruptly missing in the portion of the flood plain that was plowed. Nor was the worm found on the verges of that part of the road leading to a small bridge over the creek. At this point the road was higher than the surrounding flood plain (built from land fill) and covered with Bromus inermis (Hungarian brome grass). The worm was also missing from both cultivated and uncultivated parts of the upland around the flood plain.

From this preliminary study, it would appear that Diplocardia communis has become an uncommon to rare earthworm in Illinois and is to be found only in remnant populations on sites that approximate pre-settlement conditions. Some possible reasons for its present scarcity and perhaps declining numbers are:

(1) The worm is very fragile and thus cannot survive in cultivated soils. Even if it is not cut in two by plows and cultivators, the mere breaking up of the clods would be sufficient to tear it apart.

(2) The worm requires poorly drained soils of relatively high moisture content. Because of agricultural draining, most areas where it was formerly present (wet and mesic prairies) have become too dry for it to live in.

(3) The worm may be susceptible to various kinds of pollutants, such as, sewage, pesticides, herbicides and chemical fertilizers. Studies need to be done to determine the effect of these agents on this worm.

Further studies of this native earthworm are important. With a better understanding of its ecological requirements and type of associated vegetation, it is probable that more remnant populations can be located and studied. With this increased knowledge its abundance can be determined and the need for setting aside nature preserves for Diplocardia or introducing it into restored prairies, such as Fermilab prairie, can be evaluated.

Study also needs to be done on other Illinois native earthworms, such as, Diplocardia riparia and D. singularis, Sparganophilus eiseni and the various species of Bimastos. Like Diplocardia communis, their present distribution and status in Illinois are also unknown. It is interesting to note that during the course of this study Sparganophilus eiseni was found in muds and gravel enclosed in an old automobile tire in the middle of the Dupage River below the forks of the East and West branches in Will county. This may be the first record of the worm in this part of the state.

Bibliography

Kiefer, L.M. et al (1982). Soil Survey of Iroquois County, Illinois: U.S. Department of Agriculture, Soil Conservation Service. p. 42.