

# Distribution and Dissemination of *Punctodera punctata* on Turfgrasses in New Jersey

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## ABSTRACT

Radice, A. D., Halisky, P. M., and Myers, R. F. 1984. Distribution and dissemination of *Punctodera punctata* on turfgrasses in New Jersey. *Plant Disease* 68: 256-257.

*Punctodera punctata* was recovered from seven counties in northern New Jersey. Average counts of 36-85 cysts per 250 cc soil were associated with Kentucky bluegrass, annual bluegrass, perennial ryegrass, and bentgrass turf mixtures. Canadian geese (*Branata canadensis*) excreta contained five to 12 cysts per 250 cc. This migratory waterfowl probably accounts for local and distant dissemination.

In August 1926, Russell (13) observed cyst nematodes on roots of wheat in Saskatchewan. One year later, from another Canadian wheat sample, Thorne (10) described *Heterodera punctata*. Subsequent reports from Michigan (2), Texas (8), North Dakota (3), Rhode Island (6), and Canada (1) listed the cool-season turfgrasses *Poa pratensis*, *P. annua*, and *Agrostis* spp. as hosts for this nematode. Brzeski et al (2) associated *H. punctata* with a distinct chlorosis and lack of vigor in Merion Kentucky bluegrass in Michigan. Mulvey and Stone (9) proposed the genus *Punctodera* to accommodate *H. punctata* and *Punctodera matadorensis*, which was also found associated with wheat in Saskatchewan.

During the summer of 1982, soil samples from a golf course in Essex County, NJ, were processed at the Nematode Detection Laboratory at Rutgers University. The bluegrass-ryegrass mixed turf from which these samples were collected showed a premature chlorosis. Analysis of these samples revealed brown, pear-shaped cysts containing eggs and juveniles. These cysts had two fenestrae, one located around the vulva and the other around the anus. This characteristic, plus the absence of a posterior protuberance or vulva cone, indicated these nematodes belonged to the genus *Punctodera* (Fig. 1). Cysts from three geographically distinct locations were sent to A. M. Golden, Nematology Laboratory, USDA,

ARS, Beltsville, MD, who confirmed them as *P. punctata*. The purpose of this paper is to report the occurrence, distribution, and dissemination of *P. punctata* on cool-season turfgrasses in New Jersey.

## MATERIALS AND METHODS

**Survey.** Soil samples were collected from five fairways from three or four golf courses in each of 20 counties in New Jersey. Golf courses throughout the state were seeded with Kentucky bluegrass (*Poa pratensis*), annual bluegrass (*P. annua*), perennial ryegrass (*Lolium perenne*), and bentgrass (*Agrostis* spp.).

Cysts were extracted from soil (250-cc aliquots) by a sugar-flotation method (4) and counts were made using a dissecting

microscope at  $\times 20$ .

**Dissemination.** In order to determine the dissemination of cysts, excreta from Canadian geese (*Branata canadensis*) were collected from five counties infested with the nematode. The excreta (250 cc) were analyzed for cysts in the same manner as was the soil.

## RESULTS AND DISCUSSION

**Survey.** *P. punctata* was isolated from seven of the 20 counties sampled (Fig. 2). The distribution at present is restricted to the northern portion of the state, except for Mercer County in central New Jersey. The soil in these northern counties is a loam type with a shale-based parent material. Drainage is poor and flooding is frequent in these areas.

Each fairway sample averaged between 36 and 85 mature brown-tan females, with the highest infestation level being 258 cysts per 250 cc soil. Immature, white females were found attached to roots of *P. annua* and *P. pratensis* during May. *Heterodera*-type males found during May were presumed to be *P. punctata*, because the only other cyst nematode found was *H. trifolii*, which is thelytokous

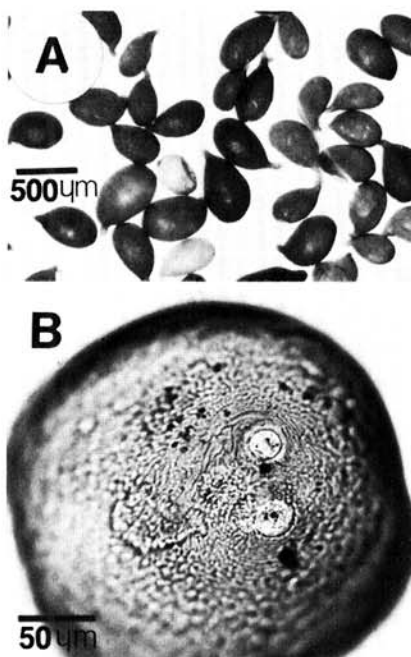


Fig. 1. (A) Pear-shaped *P. punctata* cysts containing eggs and juveniles recovered from a golf course located in Essex County, NJ. (B) Terminal area of *P. punctata* cyst showing anal and vulval fenestrae.

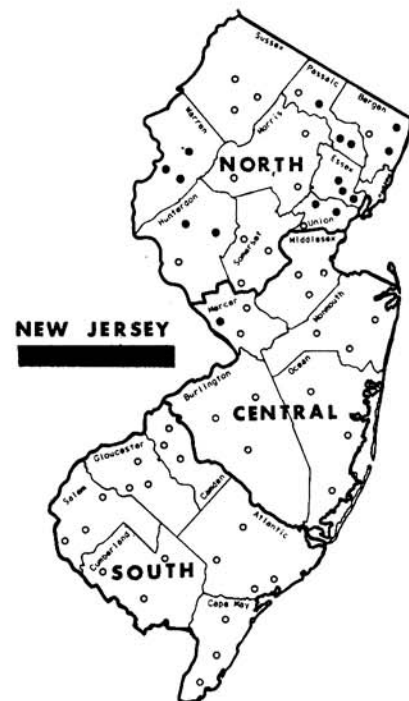


Fig. 2. Distribution of *P. punctata* in New Jersey. Solid dots show where nematodes were detected. Open circles show where nematodes were not detected. Scale line: 20 mm = 36 mi.

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(consists of females only) and reproduces by mitotic parthenogenesis (12).

**Dissemination.** Five to 12 brown cysts containing eggs and juveniles were extracted from excreta from two locations where Canadian geese were sighted by the first author.

The distribution of *P. punctata* in New Jersey seems to be limited to loam and silt soils. These soil types are less prone to drying than sandy soils in the central and southern counties. Sandy soils dry more rapidly and possibly expose cysts to drought conditions.

Thorne (11) suggested that migratory birds such as ducks and geese might transport nematodes to new locations. Epps (5) demonstrated that three species of black birds served as vectors for the soybean cyst nematode, *H. glycines*, in Tennessee and most likely were a principal means of introducing this pest into other states. From this study, it is believed that Canadian geese probably account for local and distant dissemination of *P. punctata*.

In the United States, the known distribution of *P. punctata* ranges from Rhode Island to Texas and as far west as North Dakota. Horne (7) listed the

economically important small grains, wheat (*Triticum aestivum*), oats (*Avena sativa*), and barley (*Hordeum vulgare*), as moderate hosts for *P. punctata* under field conditions. *P. annua*, however, was the most favorable host for this nematode.

Because aerial dissemination of this nematode can occur over long distances, periodic surveys of areas that produce small grains will aid in monitoring the distribution of this nematode. Pathogenic capabilities and host range studies are in progress.

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