PLANT AND SOIL NEMATODES

SOUTHERN STING NEMATODE (*IBIPORA LOLII*), THE MOST DAMAGING NEMATODE PEST OF TURFGRASS IN AUSTRALIA

A wide range of plant-parasitic nematodes damage the roots of turfgrass (see Fact sheet PSN 020). This sheet focuses on southern sting nematode (*Ibipora lolii*), the most destructive turfgrass pest in Australia.

Distribution

Ibipora lolii was widespread on bowling greens, golf tees and putting greens in the Newcastle area of NSW in the 1970s and greenhouse tests showed that it reproduced on four grasses and severely reduced the growth of *Cynodon dactylon* and *Lolium perenne* (Siviour and McLeod 1979). Since then, the nematode has spread to other coastal areas of NSW and now infests several golf courses in Sydney, about 160 km away, and has been moved 400 km north to Coffs Harbour. Circumstantial evidence suggests the nematode was also transferred to Western Australia in the late 1970s and it is now found on many sports fields, golf courses and other recreational areas in the Perth metropolitan area. Isolated infestations have also been reported from some other states.

Taxonomy

Ibipora lolii is a relatively long nematode (1.8 to 2.6 mm in length) and one of its most obvious features is the long and flexible stylet, which is about 120 µm long. The female has a broadly rounded tail and a vulva positioned about halfway along the body, while the male is distinguished by a tail that tapers to a sharp point and is enveloped by a long and narrow bursa (Fig. 1).

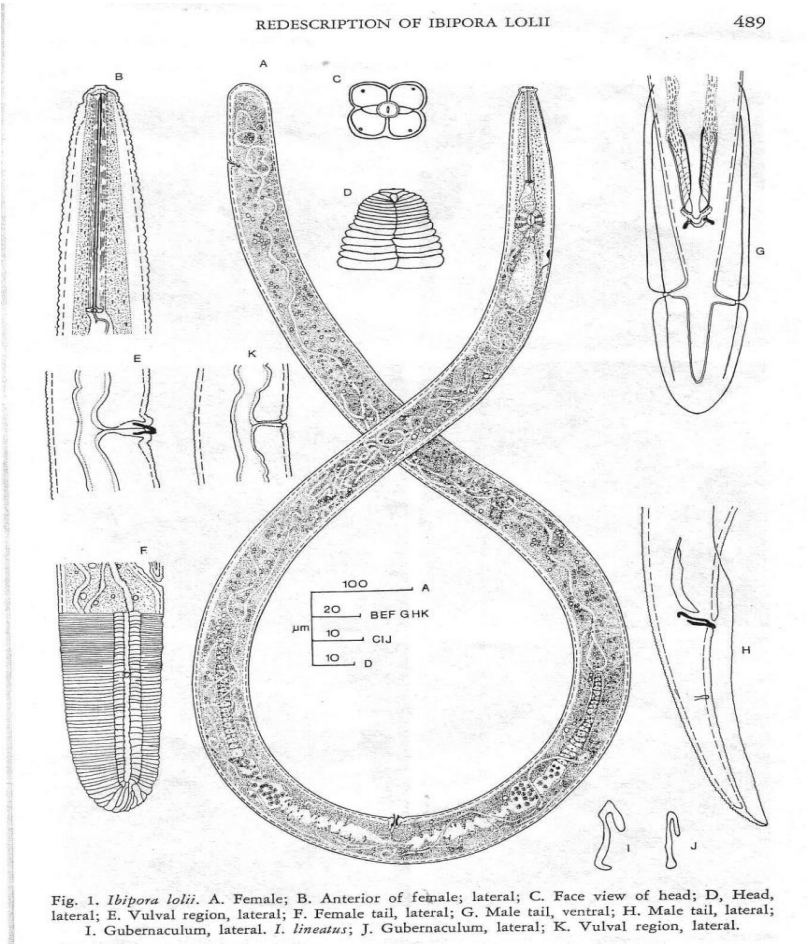

Fig. 1. Taxonomic features of *Ibipora lolii* (from Siviour & McLeod, 1979).

Feeding habits, pathogenicity, and population dynamics

Ibipora lolii is an ectoparasitic nematode, which means it remains in the soil throughout its life cycle and feeds externally on roots. During the feeding process, the stylet is inserted into tissues near the root tip (Fig. 2), and this reduces root elongation and causes lesions to form on root tips. Clusters of short, stunted roots may also occur because roots tend to proliferate behind the damaged tips. Above-ground symptoms include wilting, yellowing, and unthriftiness, and are particularly severe on municipal sports fields, where inputs of nutrients and irrigation water are limited by cost. Plants in heavily trafficked areas at such locations always struggle to recover because when new roots are produced, they grow no more than a few centimetres before being damaged by the nematode (Fig 3.).

Studies in Perth indicate that *I. lolii* reproduces throughout the year but numbers tend to increase during the winter rainfall period, when conditions are cool and wet. Populations are sometimes greater than 200 nematodes/200 mL soil, a figure that is much higher than the damage threshold, which is thought to be about 20 nematodes/200 mL soil.

Fig. 2. Sting nematodes feeding ectoparasitically on a turfgrass root.

Fig. 3. Damage to kikuyu on a sports field in Perth (from Peter Ruscoe and Ken Johnston)

Management

Damage caused by plant-parasitic nematodes is more evident when turf is under stress, and so practices that reduce overall stress levels can help the grass counteract the detrimental effects of nematodes. Thus, practices that alleviate stress should always be a component of management programs for southern sting nematode.

- Raise the mowing height to give the grass more photosynthetic capacity
- Fertilise repeatedly (but at lower rates) than normal to counter poor nutrient uptake from damaged roots
- Irrigate regularly to minimise moisture stress
- Enhance root growth by avoiding compaction and promoting aeration
- Avoid shading, as this reduces plant growth and lowers the turf's tolerance to nematode damage
- Use tactics that encourage the development of an active and diverse soil biological community (e.g. organic inputs, avoidance of fungicides and pesticides)

All the above practices will enhance the turf's ability to withstand damage caused by southern sting nematode. However, they will also increase maintenance costs and may have detrimental environmental effects such as nutrient leaching. Although it may be possible to accommodate the increased maintenance costs in intensively managed areas such as golf courses and major sports stadiums, this is not likely to be feasible on community-based sports fields and other recreational turf. Thus, research is required to develop methods of managing the nematode in situations where input costs are a limitation and nematicides cannot be applied for safety reasons.

Chemical nematicides are commonly used to reduce populations of plant-parasitic nematodes on turfgrass, and as of January 2023, abamectin (Agador®) and fluopyram (Indemnify®) were registered for use in Australia. However, there is no published data to indicate that they are effective against *I. lolii*, and so if they are applied, it would be wise to check whether numbers have been reduced and to what depth. The other issue that should be considered when nematicides are used regularly is whether their efficacy will eventually

be limited by enhanced microbial degradation, as occurred with a widely used nematicide (fenamiphos, Nemacur®) in the 1980s.

Biosecurity

Although the management practices discussed above may improve the health of turf that is infested with southern sting nematode, the most important thing a turf manager should do is prepare a biosecurity plan. Plant-parasitic nematodes are spread when infested soil or planting material is moved to a new location, and so every effort should be made to prevent this spread. Thus, if southern sting nematode is known to be present at a site under your management, establish a monitoring program to map out its distribution. If the nematode is only present in a limited area, then develop a plan that will prevent it being moved to non-infested areas.

If a site under your management is known to be free of southern sting nematode, then a biosecurity plan is even more important. Thus, check the current distribution of the nematode and ensure turfgrass and soil is only obtained from locations and suppliers known to be free of the nematode. If a nearby site is infested, it is also important to minimise the chances of the nematode being transferred on machinery or footwear.

Literature cited

Siviour TR, McLeod RW (1979) Redescription of *Ibipora lolii* (Siviour 1978) comb. N. (Nematoda: Belonolaimidae) with observations on its host range and pathogenicity. *Nematologica* 25, 487-493.

Further reading

Stirling GR, Stirling AM, Giblin-Davis RM, Ye W, Porazinska DL, Nobbs JM, Johnston KJ (2013) Distribution of southern sting nematode, *Ibipora lolii* (Nematoda: Belonolaimidae), on turfgrass in Australia and its taxonomic relationship to other belonolaimids. *Nematology* 15, 401-415.

Ruscoe PE, Stirling GR (2020) Southern sting nematode (*Ibipora lolii*), a serious pest of turf grasses in Australia. A review of what can be learnt from research on *Belonolaimus longicaudatus*, a closely related pest of turfgrass and many crops in the United States. *Australasian Plant Pathology* 49, 493-504.

Ruscoe PE, Aitken EAB, Stirling GR (2021) Southern sting nematode (*Ibipora lolii*): its distribution and population dynamics in Western Australia and an assessment of resistance and tolerance to the nematode in turf grasses. *Australasian Plant Pathology* 50, 559-569

Stirling GR, Stirling AM, Eden L (2021) Plant-parasitic nematodes on turfgrass in Queensland, Australia, and biosecurity issues associated with the interstate transfer and eradication of southern sting nematode (*Ibipora lolii*). *Australasian Plant Pathology* 50, 695-704

Fact sheet PSN 027. Updated 25 January 2023
Author: Graham R Stirling, Plant and Soil Nematodes. **Contact details:** graham.stirling@biolcrop.com.au
Other nematology fact sheets in this series can be accessed at: https://www.appsnet.org/nematodes