

Ditylenchus dipsaci (Kühn, 1857) Filipjev, 1936

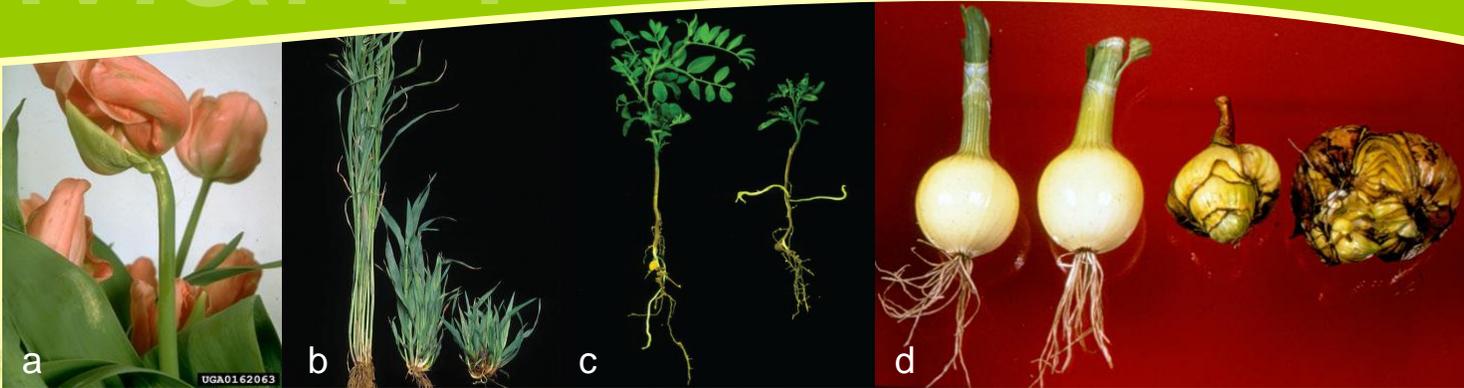


Figure 1. Symptoms of *Ditylenchus dipsaci* (a) distorted tulip flowers; (b & c) Oat and lentils stunted and distorted with swollen stem bases (plants on right); (d) damage to onions (bulbs on right). Photo credits: (a) Central Science Laboratory, Harpenden Archive, British Crown, Bugwood.org. (b & c) Sharyn Taylor, PHA; (d) Ontario Crop IPM, omafra.gov.on.ca.

Common names: Stem Nematode, Bulb Nematode

Classification: K: Animalia, P: Nematoda, C: Secernentea, O: Tylenchida, F: Anguinidae

Stem Nematode (*Ditylenchus dipsaci*) is one of the most devastating plant parasitic nematodes and is widely distributed mainly in temperate areas. It is of great economic significance worldwide and on the list of quarantine organisms of many countries. *D. dipsaci* is an endoparasite and feeds in parenchymatous tissues in stems and bulbs. It is a recognised pest of a wide range of root crops, ornamental and nursery plants, oat, pulse and some pasture crops. The oat, lucerne and clover races of this nematode occur in South Australia, Victoria and New South Wales, but crop damage from this nematode has not been recorded in other Australian states.

Lifecycle: In Australian conditions Stem Nematode can complete its lifecycle in less than 30 days. Therefore populations have the potential to rapidly increase under cold, moist conditions and 4 or 5 life cycles can be completed in a cropping season. Stem Nematode survives desiccation and can remain anhydrobiotic for up to 10 years in organic matter, hay, dry soil and seed. In moist conditions the nematodes mobilise and migrate toward host plants. The nematodes usually invade young growing stem tissues (especially seedlings) while they are still below the soil surface (Hooper 1972).

Host range: At least 450 plant species are known to host *D. dipsaci*. The oat race reported in Australia infects oat, faba bean, field pea and wild oat, and has also been recorded on canola, lentil and chickpea seedlings. Stem Nematode can also be highly damaging to some horticultural, ornamental and nursery plants. Access to some international and domestic markets requires produce (including seed) to be tested and found free of Stem Nematode.

Symptoms: Infested stems are often swollen, stunted and distorted with malformed leaves. Necrosis of stem bases, bulbs, tubers and rhizomes is also common. For example, oats and rye usually produce extra tillers and have 'tulip root' appearance while onions become bloated with distorted leaves. Many infested plant eventually die leaving bare patches in crops.

Impact: Stem Nematode prefers heavier soils, cool temperatures and moist conditions. However, if new races are introduced or it becomes established in any new Australian cropping or horticultural area, it would be difficult to eradicate and crop losses could be devastating. For example, in oat crops, this nematode has caused significant yield losses and although introduction of resistance has greatly reduced its impact, if new

races were introduced, considerable additional effort in breeding and management would be required.

Key Distinguishing Features: Eighty-one species of *Ditylenchus* are currently recognised, many of which are morphologically similar, with few useful taxonomic characters for species discrimination.

Identification of *D. dipsaci* is further complicated as there are at least 30 races which are distinguished broadly on host plant preferences. Races are not morphologically distinguishable, but can have different optimal temperature requirements for development, egg deposition, invasiveness, and reproductive capability. Some hosts can be attacked by several races, so the use of differential host plant species is not always conclusive. Some races interbreed freely and produce fertile progeny, whereas others do not.

It would be difficult to deduce the occurrence of races present in Australia based solely on host plant records, since *D. dipsaci* races do not always show great host specificity (e.g. strawberry, phlox and onion are each attacked by several races).

Management and control:

Hot water treatment is often used to disinfect bulbs. Resistant varieties of some crops (e.g. oat) are available. However, seedling stages of some resistant crops (e.g. field pea, chickpea) are intolerant to the nematode.

Rotations with non-host crops (e.g. wheat and barley) are recommended for at least 3 years on infested land. Susceptible weeds (e.g. wild oat, ryegrass) should be controlled.

Avoiding spread of stem nematode by infested plant material, hay, seed and soil is critical, as is restricting movement of stock and machinery from infested areas.

Further Reading:

Hooper, D.J. (1972) *Ditylenchus dipsaci*. *CIH Descriptions of Plant-parasitic Nematodes Set 1, No. 14*.
 Nickle, W.R. (1991) *Manual of Agricultural Nematology*. Marcel Dekker, Inc., New York, Basel, Hong Kong. 1035 pp.
 Taylor, S. (2003) *Stem Nematode*. SARDI Crop Pathology.
 Vanstone, VA., Russell, J. (2010) Fact sheet – Stem Nematode. Plant Health Australia. PHA11-009

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