EPPO Datasheet: *Meloidogyne graminicola*

Last updated: 2025-08-26

IDENTITY

Preferred name: *Meloidogyne graminicola*
Authority: Golden & Birchfield
Taxonomic position: Animalia: Nematoda: Chromadorea: Rhabditida: Meloidogynidae
Common names: Rice root?knot nematode
view more common names online...
EPPO Categorization: A2 list
view more categorizations online...
EU Categorization: Emergency measures
EPPO Code: MELGGC

more photos...

HOSTS

The main economically important host of *Meloidogyne graminicola* is rice (*Oryza sativa*). This root-knot nematode has primarily been found attacking irrigated and rainfed rice, lowland and upland rice, and deepwater rice. However, *M. graminicola* has a wide host range (see list below) belonging to different families, mainly Poaceae but also Asteraceae, Cucurbitaceae, Fabaceae, Solanaceae (MacGowan & Langdon, 1989). It has been found associated with other cereals as well as dicotyledonous and grass plants, including many weeds commonly present in rice fields that may constitute a major reservoir of nematodes (Bridge et al. 2005; Bridge & Starr 2007; Rich et al. 2009). In Italy, *M. graminicola* has been found associated with rice and weeds (*Alisma plantago-aquatica, Cyperus difformis, Echinochloa crus-galli, Heteranthera reniformis, Murdannia keisak, Oryza sativa* var. *sylvatica, Panicum dichotomiflorum*) growing in the vicinity of affected rice plants (Fanelli et al., 2017).

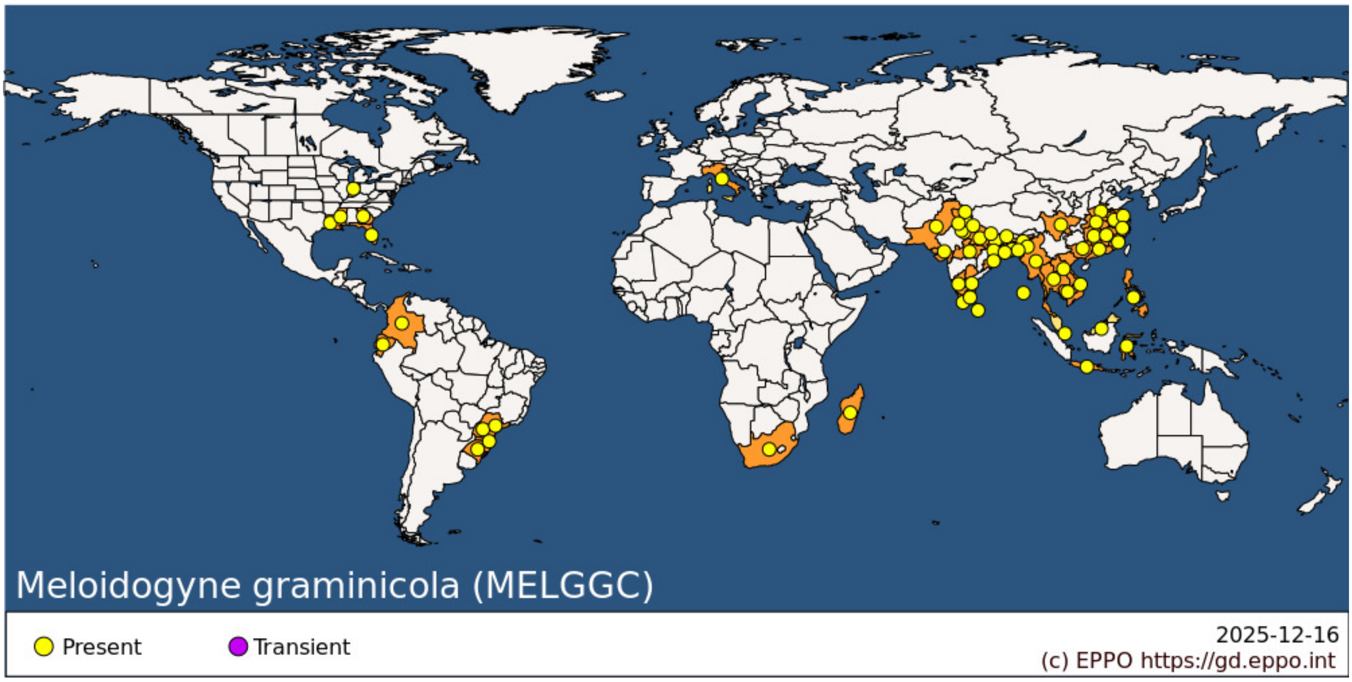
Many plants are recorded as hosts, however, it should be noted that host status depends on the host plant varieties and on the *M. graminicola* biotypes.

Host list: *Abelmoschus esculentus, Ageratum conyzoides, Agrostis stolonifera, Alisma plantago-aquatica, Allium ascalonicum, Allium cepa, Allium fistulosum, Allium tuberosum, Alopecurus carolinianus, Alopecurus sp., Alternanthera sessilis, Amaranthus spinosus, Amaranthus viridis, Ammannia baccifera, Andropogon sp., Beta vulgaris, Blumea sp., Bonnaya ciliata, Bothriochloa bladhii, Brassica juncea, Brassica oleracea var. botrytis, Brassica oleracea, Capsicum annuum, Capsicum frutescens, Catharanthus roseus, Cenchrus americanus, Cenchrus pedicellatus, Centella asiatica, Colocasia esculenta, Commelina benghalensis, Corchorus aestuans, Corchorus capsularis, Coriandrum sativum, Cucumis sativus, Cyanotis axillaris, Cyanotis cucullata, Cyanthillium cinereum, Cymbopogon citratus, Cynodon dactylon, Cyperus compressus, Cyperus difformis, Cyperus esculentus, Cyperus imbricatus, Cyperus iria, Cyperus odoratus, Cyperus pilosus, Cyperus procerus, Cyperus pseudokyllingioides, Cyperus pulcherrimus, Cyperus rotundus, Dactyloctenium aegyptium, Desmodium triflorum, Digitaria filiformis, Digitaria longiflora, Digitaria sanguinalis, Echinochloa colonum, Echinochloa crus-galli, Eclipta prostrata, Eleusine coracana, Eleusine indica, Elymus repens, Eragrostis racemosa, Eragrostis tenella, Euphorbia hirta, Fimbristylis complanata, Fimbristylis dichotoma var. pluristriata, Fimbristylis dichotoma, Fimbristylis littoralis, Fimbristylis quinquangularis subsp. quinquangularis, Fuirena ciliaris, Gamochaeta falcata, Gamochaeta purpurea, Glycine max, Grangea ceruanoides, Hedyotis diffusa, Heteranthera reniformis, Hordeum vulgare, Hydrilla sp., Impatiens balsamina, Imperata cylindrica, Ipomoea aquatica, Ischaemum rugosum, Juncus microcephalus, Kyllinga brevifolia, Kyllinga gracillima, Lactuca sativa, Leersia hexandra, Leptochloa chinensis, Leucas lavandulifolia, Lindernia sp., Lolium multiflorum, Ludwigia adscendens, Mecardonia procumbens, Medicago polyceratia, Melilotus albus, Murdannia keisak, Murdannia nudiflora, Musa acuminata, Musa sp., Oplismenus compositus, Oryza sativa, Oxalis corniculata, Panicum dichotomiflorum, Panicum flexuosum, Panicum miliaceum, Panicum repens, Paspalum scrobiculatum, Petunia sp., Phaseolus vulgaris, Phlox drummondii, Phyllanthus niruri, Phyllanthus urinaria, Physalis minima, Pisum sativum, Poa annua, Pontederia vaginalis, Portulaca oleracea, Ranunculus pusillus, Ranunculus sp., Rungia parviflora, Saccharum officinarum, Sacciolepis indica*

, *Schoenoplectiella articulata*, *Scoparia dulcis*, *Setaria italica*, *Sida acuta*, *Solanum lycopersicum*, *Solanum melongena*, *Solanum nigrum*, *Solanum sisymbriifolium*, *Solanum tuberosum*, *Sorghum bicolor*, *Spergula arvensis*, *Spermacoce articularis*, *Sphaeranthus senegalensis*, *Sphaeranthus sp.*, *Sphenoclea zeylanica*, *Spinacia oleracea*, *Stellaria media*, *Trifolium repens*, *Triticum aestivum subsp. aestivum*, *Urena lobata*, *Urochloa mutica*, *Urochloa ramosa*, *Vandellia sp.*, *Vicia faba*, *Vigna mungo*, *Vigna radiata*, *Zea mays*

GEOGRAPHICAL DISTRIBUTION

M. graminicola was first isolated in India by Israel et al. (1963), but it was described in 1965 from the roots of barnyard grass (*Echinochloa colonum*) in Baton Rouge, Louisiana, USA (Golden & Birchfield, 1965). Until 2016, *M. graminicola* was only known to occur in Asia, Madagascar and South Africa, and in part of the Americas. In the EPPO region, *M. graminicola* was first reported in 2016 in northern Italy in rice fields in Piedmont (provinces of Biella and Vercelli) (Fanelli et al., 2017), followed in 2018 by other outbreaks in Lombardy (province of Pavia) (EPPO, 2018).



EPPO Region: Italy (mainland)
Africa: Madagascar, South Africa
Asia: Bangladesh, Cambodia, China (Anhui, Fujian, Guangdong, Guangxi, Hainan, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Zhejiang), India (Andaman and Nicobar Islands, Andhra Pradesh, Assam, Bihar, Delhi, Gujarat, Haryana, Himachal Pradesh, Jammu & Kashmir, Jharkand, Karnataka, Kerala, Madhya Pradesh, Manipur, Odisha, Punjab, Sikkim, Tamil Nadu, Tripura, Uttarakhand, Uttar Pradesh, West Bengal), Indonesia (Java, Sulawesi), Lao People's Democratic Republic, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, Vietnam
North America: United States of America (Florida, Georgia, Indiana, Louisiana, Mississippi)
South America: Brazil (Parana, Rio Grande do Sul, Santa Catarina, Sao Paulo), Colombia, Ecuador

BIOLOGY

M. graminicola is a root-knot obligate sedentary endoparasite. Like the other *Meloidogyne* species, its life cycle comprises the developmental stages: eggs, four juvenile stages and adults. The eggs are laid in egg masses inside the root cortex, although for a few host plants (e.g. *Lolium multiflorum*) egg masses have also been observed outside roots (Negretti *et al.*, 2014); the first juvenile stage (J1) develops inside the egg and moults to the second one (J2), which hatches under favourable environmental conditions. After hatching, the J2s may be either move into the soil or remain inside the tissues of the same root gall. The J2s outside the root move through the soil to find a suitable host, actively penetrate the root near the tip towards the meristematic zone and start feeding, inducing a permanent feeding site in the stele with the formation of syncytium and galls (Gheysen & Mitchum, 2011). The J2s which stay inside the maternal gall, either remain there or migrate intercellularly through the parenchymal cortex tissue towards new feeding sites within the same root, with the consequent formation of new galls (Mulk 1976; Bridge & Page, 1982; Kyndt *et al.*, 2012), allowing *M. graminicola* to complete its life cycle without leaving the host under flooded conditions when roots are submerged.

Inside the root, the J2s become sedentary and flask-shaped moulting to the third juvenile stage (J3), fourth juvenile stage (J4), and adult male or female stages (Gaur, 2003). The J3s and J4s do not have a functional stylet, hence they do not feed. Females are pear-shaped with a small neck (Mulk, 1976) and vermiform non-infective male specimens are both present in the same gall. Later, adult males leave the root and move into the soil, not able to attack plants.

Typically, about 15-20 (occasionally up to 30) females of *M. graminicola* each bearing hundreds of eggs occur in one gall (Peng *et al.*, 2018). *M. graminicola* is a facultative meiotic parthenogenetic species in which amphimixis can occur at a low frequency (approximately 0.5%) (Triantaphyllou, 1969; Mantelin *et al.*, 2017). In paddy fields of northern Italy, only J2s were observed inside the roots at the second/beginning third leaf stage, mostly J3s, J4s, and males at the end third/beginning fourth leaf stage and females from the fourth leaf unfolded stage of rice plants (Sacchi *et al.*, 2021).

In experiments under glasshouse condition at room temperature, J2 *M. graminicola* entered the rice roots within 24 hrs. The duration of the life cycle from egg to J2, J3, J4, adult male and female stages was respectively 1-5, 6-8, 9-12, 23 and 26 days. The total duration, including the pre-parasitic stage, from egg to female was 25-28 days and females laid about 250-300 eggs in an egg sac inside the root tissues (Narasimhamurthy *et al.* 2018). Other studies reported that, compared with other *Meloidogyne* species, *M. graminicola* is characterized by a relatively fast life cycle, completed in 19–27 days depending on the soil temperature, which usually ranges from 22 to 29 ºC in the areas in which *M. graminicola* is found (Yik & Birchfield, 1979; Bridge & Page, 1982; Dutta *et al.*, 2012).

M. graminicola J2s remain inside the root under flooded conditions but quickly leave the root and infest root tips of other plants when soils are drained (Manser, 1968); J2s that are already in the soil can survive for several weeks, in flooding condition, but they will not infest roots until the water is removed (Bridge & Page, 1982), therefore their presence in soil is dependent on the watering system of the rice crop. The survival of egg masses and J2s in soil was studied by various authors: Roy (1982) observed, *in vitro*, that numbers of egg masses decline rapidly after 4 months under waterlogged and moist conditions, and that some egg masses survive for longer periods remaining viable for at least 14 months in waterlogged soil; Bridge & Page (1982) highlighted the J2s surviving in flooded soil for at least 5 months; Soomro (1989) reported that J2s of *M. graminicola* could survive and remain viable in moist soil, without a host plant, for up to 5 months, highlighting the nematode's ability to persist between rice cropping seasons, potentially impacting future rice yields; Padgham *et al.* (2003) verified, in greenhouse experiments, the survival and infectivity of *M. graminicola* up to 12 weeks incubation, demonstrating that both are significantly higher in flooded than in non-flooded soils; Soomro (1994) observed a 5 months survival of the rice root-knot nematode, in moist soil at 20-30°C without any host, greater at the lowest temperature.

In most cases *M. graminicola* survives in the roots of infested plants after the rice harvest and in the root system of weed hosts.

DETECTION AND IDENTIFICATION

Symptoms

The symptoms of *M. graminicola* infestation are shown in the whole root system as characteristic swollen hook-shaped galls of different shapes and sizes, mainly at the root tips, which can also be club-shaped (Fanelli *et al.*, 2017). Hook-shaped deformations are also typical of *Meloidogyne oryzae*, while *Meloidogyne salasi* produces oval or hook-shaped galls mainly restricted to the root tips (Sancho *et al.*, 1987; López, 1991).

Root infestation by nematodes, including *M. graminicola*, reduces the absorbent function of the roots leading to above-ground symptoms such as poor growth, stunting, leaf chlorosis, decreased leaf size, internode shortening, dwarfism, reduced tillering in cereal crops, delayed earhead emergence, poor/absent flowering, empty or poorly filled spikelets, and can lead to the death of plants in the case of exceptionally large-scale infestations (McClure, 1977; Bridge & Page, 1982; Fanelli *et al.*, 2017; Peng *et al.*, 2018; Fanelli *et al.*, 2022). In rice fields infested by *M. graminicola*, in early summer, the symptoms generally occur in patches in young plants prior to flooding, but may also present along a linear gradient, caused by the direction of cultural practices in the crop. In late summer and autumn, the above-ground symptoms may regress after flooding and application of fertiliser, because the patches can be covered by the vegetation of other rice plants. At this stage, rice fields can appear more uniform, but the infested plants show either a poor caryopsis production and empty spikelets or, in case of heavy infestation, they remain submerged and unable to elongate rapidly, causing plant death and leaving patches of open water in the flooded fields (Bridge & Page, 1982; Peng *et al.*, 2018).

Severe infestation and large galls can also be observed on weeds. In Italy, the weeds found infested (see Hosts) showed the same above-ground symptoms as rice plants (Fanelli *et al.* 2017). The symptoms of *M. graminicola* infestation are shown in the whole root system as characteristic swollen hook-shaped galls of different shapes and sizes, mainly at the root tips, which can also be club-shaped (Fanelli *et al.*, 2017). Hook-shaped deformations are also typical of *Meloidogyne oryzae*, while *Meloidogyne salasi* produces oval or hook-shaped galls mainly restricted to the root tips (Sancho *et al.*, 1987; López, 1991).

Root infestation by nematodes, including *M. graminicola*, reduces the absorbent function of the roots leading to above-ground symptoms such as poor growth, stunting, leaf chlorosis, decreased leaf size, internode shortening, dwarfism, reduced tillering in cereal crops, delayed earhead emergence, poor/absent flowering, empty or poorly filled spikelets, and can lead to the death of plants in the case of exceptionally large-scale infestations (McClure, 1977; Bridge & Page, 1982; Fanelli *et al.*, 2017; Peng *et al.*, 2018; Fanelli *et al.*, 2022). In rice fields infested by *M. graminicola*, in early summer, the symptoms generally occur in patches in young plants prior to flooding, but may also present along a linear gradient, caused by the direction of cultural practices in the crop. In late summer and autumn, the above-ground symptoms may regress after flooding and application of fertiliser, because the patches can be covered by the vegetation of other rice plants. At this stage, rice fields can appear more uniform, but the infested plants show either a poor caryopsis production and empty spikelets or, in case of heavy infestation, they remain submerged and unable to elongate rapidly, causing plant death and leaving patches of open water in the flooded fields (Bridge & Page, 1982; Peng *et al.*, 2018).

Severe infestation and large galls can also be observed on weeds. In Italy, the weeds found infested (see Hosts) showed the same above-ground symptoms as rice plants (Fanelli *et al.* 2017). The symptoms of M. graminicola infestation are shown in the whole root system as characteristic swollen hook-shaped galls of different shapes and sizes, mainly at the root tips, which can also be club-shaped (Fanelli et al., 2017). Hook-shaped deformations are also typical of Meloidogyne oryzae, while Meloidogyne salasi produces oval or hook-shaped galls mainly restricted to the root tips (Sancho et al., 1987; López, 1991). Root infestation by nematodes, including M. graminicola, reduces the absorbent function of the roots leading to above-ground symptoms such as poor growth, stunting, leaf chlorosis, decreased leaf size, internode shortening, dwarfism, reduced tillering in cereal crops, delayed earhead emergence, poor/absent flowering, empty or poorly filled spikelets, and can lead to the death of plants in the case of exceptionally large-scale infestations (McClure, 1977; Bridge & Page, 1982; Fanelli et al., 2017; Peng et al., 2018; Fanelli et al., 2022). In rice fields infested by M. graminicola, in early summer, the symptoms generally occur in patches in young plants prior to flooding, but may also present along a linear gradient, caused by the direction of cultural practices in the crop. In late summer and autumn, the above-ground symptoms may regress after flooding and application of fertiliser, because the patches can be covered by the vegetation of other rice plants. At this stage, rice fields can appear more uniform, but the infested plants show either a poor caryopsis production and empty spikelets or, in case of heavy infestation, they remain submerged and unable to elongate rapidly, causing plant death and leaving patches of open water in the flooded fields (Bridge & Page, 1982; Peng et al., 2018). Severe infestation and large galls can also be observed on weeds. In Italy, the weeds found infested (see Hosts) showed the same above-ground symptoms as rice plants (Fanelli et al. 2017).

Morphology

The description of males, females and J2s are reported in the EPPO Diagnostic Standard PM 7/158 (1) *Meloidogyne graminicola* (EPPO, 2025) and in CABI Compendium, Datasheet on *Meloidogyne graminicola* (CABI, 2021).

Inspection and detection methods

Visual field inspection

Inspected areas should be chosen considering the biology of this species and its main hosts. Particular attention is needed in rice paddies and arable land close to infested areas. Fields have to be inspected from plant emergence to the end of tillering, verifying the presence of chlorotic patches and/or lack of plants and, in general, a poor growth of the crop. If above-ground symptoms are verified, visual inspection is carried out by uprooting symptomatic plants and verifying the presence of hook-shaped root galls, because the rice roots can contain many more nematodes than soil (Bridge & Page, 1982).

Sampling

15/20 symptomatic plants, including root systems and rhizosphere soil, are collected for laboratory analysis, with at least 5 g of roots showing galls and 200 mL of rhizosphere soil. In asymptomatic plots, 15/20 random plants with roots and adhering soil can be sampled in different points of each plot, forming a single sample for the nematological analysis. Samples should be kept moist in a plastic bag in cold conditions to keep nematodes alive as long as possible, especially when extraction methods based on motility will be used (EPPO, 2013; Italian NPPO, 2023).

Root-gall inspection

The roots of rice plants are gently washed, dried and observed with the naked eye and under a stereomicroscope, to check for the characteristic swollen hook/club-shaped galls, mainly at the root tips.

Extraction

To detect *M. graminicola* in soil/growing medium, roots or water, nematodes should be extracted first. Extraction methods are detailed in the EPPO Standards PM 7/119 Nematode extraction (EPPO, 2013) and PM 7/158 (EPPO, 2025).

Identification

Identification of *M. graminicola* is detailed in the EPPO Diagnostic Standard PM 7/158 (EPPO, 2025) and the diagnostic protocol of the European Union Reference Laboratory for Plant Parasitic Nematodes (2024).

PATHWAYS FOR MOVEMENT

M. graminicola is associated with the roots of its host plants or with soil (or growing media). The natural spread of *M. graminicola* in the soil is limited to short distances towards roots, up to ca. 1-2 m per year (Tiilikkala *et al.* 1995). *M. graminicola* may also move locally with waterbirds, wind transporting soil, and surface water (Torrini *et al.*, 2020; EPPO, 2023). In paddy fields, passive transport may be facilitated by water flowing from one infested field to others nearby dispersing the pest over short and medium distances. Irrigation water is considered important for local spread but is considered to have a moderate role for spread of nematodes to new areas (Padgham *et al.*, 2003; Torrini *et al.*, 2020). The number of infective *M. graminicola* juveniles in the soil oscillates throughout the year (Win *et al.*, 2013). High levels of infested volunteer rice plants, susceptible weeds and forage growing in rice fields represent a high risk of infestation and damage for the host crops in rotation, because they may also host *M. graminicola* and allow nematodes to survive and reproduce in off-seasons without a rice crop (Medina *et al.*, 2009) contributing to an increase in the population level in the soil and rice infestation in the following crop season (Pokharel *et al.*, 2007).

The potential pathways for entry *M. graminicola* into new areas are the following (Torrini *et al.*, 2020; EPPO, 2023): host plants for planting and bulbs, tubers, corms and rhizomes of host plants, intended for planting, with or without soil or growing media; soil or growing medium in which infested host plants have been grown (which may contain eggs, J2s and males); soil attached to equipment and agricultural machinery (EPPO, 2023); passengers coming from areas where the pest is present by means of soil attached to footwear. Rice production in many EPPO countries is currently based on direct seed sowing and not on the use of transplants, and in such cases *M. graminicola* would not be introduced with infested rice plants. The pathway(s) which led to the introduction of *M. graminicola* in Italy is/are not known. Fanelli *et al.* (2022) suggest, based on phylogenetic analysis, that the two Italian outbreaks are related to two different introductions.

PEST SIGNIFICANCE

Economic impact

Damage data is mainly reported on rice and limited information is available for other hosts (EPPO, 2023). *M. graminicola* is a pest of international importance to rice around the world and is a major concern for yield loss due to nematode infestation in rice and wheat crops under rice–wheat cropping systems (MacGowan & Langdon 1989; Jain *et al.*, 2012), causing yield losses of up to 70% (Plowright & Bridge, 1990; Bridge *et al.*, 2005; Khan *et al.*, 2014).

In Asia *M. graminicola* represents one of the major constraints in rice production due to rice cropping intensification and increasing scarcity of water supply (Prasad & Somasekhar, 2009; Somasekhar & Prasad, 2009). In fact, the practice of direct sowing or transplanting in wet conditions, intermittent regulated irrigation and soil aeration are all practices very favourable to *M. graminicola* infestation and economic losses (Prot *et al.*, 1994; Soriano & Reversat, 2003; Jain *et al.*, 2012; Khan *et al.*, 2014). In Italy, in 2016, in Piedmont, one paddy field suffered a decrease of 30-40% in rice production, while in 2018 in Lombardy, the yield losses in infested fields reached 50% of ordinary rice production (Torrini *et al.*, 2020).

Crop losses depend on the nematode population density, rice cultivation system (flooded or dry), environmental conditions and soil structure. Yield losses caused by *M. graminicola* are estimated in a range from 20% to 80% in upland rice and 11% to 73% in intermittently flooded conditions (Plowright & Bridge, 1990; Soriano *et al.*, 2000). In upland rice, it is estimated to have a 2.6% decrease in grain yield for every 1000 J2s in the soil around young seedlings; while 10% loss in yield of upland rice is caused by population levels of *M. graminicola* of 120, 250 and 600 eggs/plant respectively at 10-, 30- and 60-days age of plants in direct seeded crops (Rao *et al.*, 1984; Rao *et al.*, 1986). Other investigations have shown that a nematode population higher than 1000 J2s/g rice root with 12-16 galls/plant, shows a 65% decrease in rice yield (Win *et al.*, 2011) and more than 75% roots infested by *M. graminicola* causes a decline in rice yield (Nugaliyadde *et al.*, 2001). Furthermore, in a paddy field, these losses may be increased if combined with other biotic or abiotic stresses, such as drought. Mantelin *et al.* (2017) observed that *M. graminicola* infestation could often be underestimated, with the atypical above-ground symptoms wrongly attributed to nutritional and water-associated disorders or to secondary diseases.

Other studies verified that different rice cultivars subjected to the same nematode pressure, has different levels of infestation by *M. graminicola* (Amarasinghe *et al.*, 2007; Amarasinghe, 2011). In addition, different nematode populations showed a different harmfulness towards the same rice variety, suggesting intraspecific variability and the existence of different races of *M. graminicola* (Pokharel *et al.*, 2007; Bellafiore *et al.*, 2015).

No information is available on *M. graminicola* damage in protected conditions, but host experiments conducted in greenhouses on rice, weeds, vegetables and ornamental plants show that the pest can develop in protected conditions (Yik & Birchfield, 1979), showing a decrease in rice yield of 17% to 80% (Tandingan *et al.*, 1996; Soriano *et al.*, 2000).

Control

The wide host range of *M. graminicola* and its ability to survive for long periods in environments with low oxygen content, make its control difficult (Torrini *et al.*, 2020). Indeed, it has been observed that waterlogged conditions in either direct seeded or transplanted rice had no effects on the survival of the endoparasitic stages (Prasad *et al.*, 1985). Increasing soil fertility can compensate for some damage by *M. graminicola*.

Some cultivars from India, Thailand and the USA are reported to be resistant to this nematode (Bridge *et al.*, 1990), although resistance may vary with the water regime (Soriano *et al.*, 2000). The screening of germplasm for resistant/tolerant genotypes, identification of sources of resistance in wild accessions of rice and the development of resistant/tolerant cultivars seem promising for an effective and economic control of *M. graminicola* (Dutta *et al.*, 2012; Pokharel *et al.*, 2012; Mantelin *et al.*, 2017; Kumari *et al.*, 2016)

The damage induced by *M. graminicola* is lower under flooding than in shallow intermittently flooded fields (Mantelin *et al.*, 2017; Sacchi *et al.*, 2021). Early flooding after sowing prevents or limits root invasion by this nematode (Bridge & Page, 1982) and promotes the establishment of the rice crop, minimizing yield losses due to *M. graminicola* in irrigated and wet seeded rice. Continuous flooding during either the whole rice growth season until harvesting (Soriano *et al.*, 2000) or even up to 18 months, seems to be one of the most effective technique in controlling *M. graminicola* population (Sacchi *et al.*, 2021), as observed in Vietnam (Dang-ngoc Kinh *et al.*, 1982) and in Italy, where Torrini *et al.* (2020) reported a flooding period at least from spring to the following winter as being effective. Nevertheless, some limitations in the application of this method are due to the poor water retention capacity of sandy, sandy-silty and loamy soils, which represent the most favourable soil categories for the development of *Meloidogyne* species (Braasch *et al.*, 1996; Soriano *et al.*, 2000). The infested Italian rice fields mainly have coarse and medium soils (Torrini *et al.*, 2020; Sacchi *et al.*, 2020) and prolonged flooding is very difficult to apply.

In infested fields, removal of infested volunteer rice plants and host weeds in a weed management programme (Padgham *et al.*, 2004; Rusique *et al.*, 2021) and crop rotation with non-host or poor host crops (e.g. castor, cowpea, soybean, sunflower, sesame, onion, turnip, common bean) (Rao *et al.*, 1986) help to decrease nematode populations to low levels.

Chemical control of *M. graminicola* in dry rice crops is generally uneconomic and, furthermore, the existing effective chemical nematicides are now banned at least in the European Union. Recent studies have investigated other possible control methods (Dallavalle *et al.*, 2020; Chavan *et al.*, 2023). The cultivation of rice plants as trap-crops is one of the most promising and effective practices suggested to the farmers for the management of the rice root-knot nematode, especially in the rice-growing areas with water shortages (Sacchi *et al.*, 2021).

Many biological control agents attack root-knot nematodes (Kerry, 1987) including *M. graminicola*, such as the bacteria *Bacillus megaterium* (Padgham & Sikora, 2007), *Bacillus subtilis* and the rhizobacterium *Pseudomonas fluorescence*; the fungi *Trichoderma harzianum*, *T. viride*, and other *Trichoderma* spp. (Huong *et al.*, 2009; Amarasinghe & Hemachandra, 2020), *Purpureocillium lilacinum* (sin. *Paecilomyces lilacinus*) (Haque *et al.*, 2018), *Arthrobotrys oligospora* and *Dactylaria eudermata* (Simon & Anamika, 2011) but no specific organisms have been recommended for control of *M. graminicola* in the field (Torrini *et al.*, 2020).

Phytosanitary risk

The main phytosanitary risk in the EPPO region is to areas where rice can be produced, and in such areas, climate will probably not be a limiting factor to the establishment of the pest (EPPO, 2023). It has already established in rice fields in limited areas of northern Italy, in Piedmont and Lombardy. Other EPPO countries have substantial rice growing areas (EPPO, 2023). In addition, *M. graminicola* is able to infest many plant species belonging to different families (mainly Poaceae but also Asteraceae, Cucurbitaceae, Fabaceae, Solanaceae) including economically important crops grown in rotation with rice in the EPPO region, such as barley (*Hordeum vulgare)*, maize (*Zea mays*), oat (*Avena sativa*), soybean (*Glycine max*), tomato (*Solanum lycopersicum)*, and wheat (*Triticum* sp.) or in clover (*Trifolium* sp., *T. repens*) which is often used in rotation. Other economically important hosts of *M. graminicola* in the EPPO region are for example aubergine (*Solanum melongena*), onion (*Allium cepa*), cabbage (*Brassica oleracea*), cucumber (*Cucumis sativus*), ryegrass (*Lolium multiflorum*), pea (*Pisum sativum*), common bean (*Phaseolus vulgaris*), potato (*Solanum tuberosum*), broad bean (*Vicia faba*).

PHYTOSANITARY MEASURES

The EPPO PRA report on *M. graminicola* (EPPO, 2023) recommends phytosanitary measures for several pathways. Options for rice plants for planting with roots (with or without soil or growing media) include pest free area, pest-free place of production, pest-free production site, and consignment freedom based on inspection and testing of asymptomatic plants after harvest. Soil (on its own) should come from a pest free area, pest-free place of production or pest-free production site, or be treated. Used equipment and machinery should be cleaned (ISPM 41 – FAO, 2017). Public awareness and cleaning of footwear are relevant options in relation to passengers (EPPO, 2023).

In the EU, *M. graminicola* is subject to the emergency measures established by the Commission Implementing Regulation (EU) 2022/1372 amended in 2025 (European Commission, 2022 and 2025). In cases of outbreaks, measures aim to control the spread and to minimise yield losses, such as: intensive sampling and testing of soil and all host plants in the infested area and in buffer zones (100 m around an infested area); cleaning of equipment and machinery, tools and footwear moving from an infested field to the neighbouring ones; uprooting and destruction of infested plants; prohibition of growing host plants in infested areas; periodic elimination of host weeds; not moving infested material out of the infested area, including both host and non-host plants with roots grown in infested soil; flooding rice field for a long time, possibly more than 18 months (Torrini *et al.*, 2020); rice plants cultivated as trap-crops in three cycles for about two months (Sacchi *et al.*, 2021).

REFERENCES

Amarasinghe LD & Hemachandra KHDJK (2020) *Meloidogyne graminicola* infestation in selected Sri Lankan rice varieties, *Oryza sativa* L. and nemato-toxic effect of *Trichoderma viride* to reduce infectivity. *Journal of Science of the University of Kelaniya* **13**, 18–34. https://doi.org/10.4038/josuk.v13i0.8021

Amarasinghe LD (2011) An integrated approached to the management of rice root-knot nematode, *Meloidogyne graminicola* in SriLanka. *Journal of Science of the University of Kelaniya* **6**, 55–63. http://dx.doi.org/10.4038/josuk.v6i0.4221

Amarasinghe LD, Kariyapperuma KADPS & Pathirana HNI (2007) Study on approaches to integrated control of *Meloidogyne graminicola* in rice. *Journal of Science of the University of Kelaniya* **3**, 29–46. https://doi.org/10.4038/josuk.v3i0.2736

Bellafiore S, Jougla C, Chapuis E, Besnard G, Suong M, Vu PN, De Waele D, Gantet P & Thi XN (2015) Intraspecific variability of the facultative meiotic parthenogenetic root-knot nematode (*Meloidogyne graminicola*) from rice fields in Vietnam. *Comptes rendus, Biologies* **338**(7), 471–483. https://doi.org/10.1016/j.crvi.2015.04.002

Braasch H, Wittchen U & Unger JG (1996) Establishment potential and damage probability of *Meloidogyne chitwoodi* in Germany. *Bulletin OEPP/EPPO Bulletin* **26**(3-4), 495–509. https://doi.org/10.1111/j.1365-2338.1996.tb01492.x

Bridge J & Page SJ (1982) The rice root-knot nematode, *Meloidogyne graminicola*, on deep water rice (*Oryza sativa* subsp. *indica*). *Revue de Nématologie* **5**(2), 225–232.

Bridge J & Starr JL (2007) Chapter 5 Cereals. Rice: *Oryza sativa*. In: *Plant Nematodes of Agricultural Importance. A Colour Handbook* (Ed. Bridge J & Starr JL), pp. 52–60. Manson Publishing. USA FL: CRC Press. Taylor & Francis Group.

Bridge J, Luc M & Plowright RA (1990) Nematode parasites of rice. In: *Plant parasitic nematodes in subtropical and tropical agriculture*,1st ed. (Ed. Luc M, Sikora RA & Bridge J), pp. 69–108. CAB International Institute of Parasitology, UK.

Bridge J, Plowright RA & Peng D (2005) Nematode parasites of rice. In: *Plant parasitic nematodes in subtropical and tropical agriculture*, 2nd ed. (Ed. Luc M, Sikora RA & Bridge J), pp. 87–130. CABI Publishing, Wallingford (UK).

CABI (2021) Datasheet on *Meloidogyne graminicola. Invasive Species Compendium*. CABI International, Wallingford, UK. https://doi.org/10.1079/cabicompendium.33243 (Accessed on 25 June 2025).

Chavan SN, Tumpa FH, Khokon MAR & Kyndt T (2023) Potential of exogenous treatment with Dehydroascorbate to control root-knot nematode infection in rice. *Rice* **16**(29), 1–16. https://doi.org/10.1186/s12284-023-00644-1

Dallavalle E, Curto G, Santi R, Matteo R & Lazzeri L (2020) Host status of plant species with nematicidal activity against *Meloidogyne graminicola* (Golden & Birchfield). *Redia* **103**, 147–151. http://dx.doi.org/10.19263/REDIA-103.20.23

Dang-ngoc Kinh, Huong NM & Ut NV (1982) Root-knot disease of rice in the Mekong Delta, Vietnam. *International Rice Research Newsletter* **7**(4), 15. https://doi.org/10.5281/zenodo.7303304

Dutta TK, Ganguly AK & Gaur HS (2012) Global status of rice root-knot nematode, *Meloidogyne graminicola*. *African Journal of Microbiology Research* **6**(31), 6016–6021. https://doi.org/10.5897/AJMR12.707

EPPO (2013) EPPO Standard PM 7/119 (1). Nematode extraction. *Bulletin OEPP/EPPO Bulletin* **43**, 471–495. https://doi.org/10.1111/epp.12077

EPPO (2018) Reporting Service n.10 (2018/196): *Meloidogyne graminicola* found in 2018 in 4 Rice Fields in Lombardia Region (Province of Pavia). https://gd.eppo.int/reporting/article-6390 (Accessed 25 June 2025).

EPPO (2023) Report of a pest risk analysis for *Meloidogyne graminicola*. EPPO, Paris. https://gd.eppo.int/taxon/MELGGC/documents (Accessed 25 June 2025).

EPPO (2025) EPPO Standard PM 7/158(1) *Meloidogyne graminicola*. *Bulletin OEPP/EPPO Bulletin* (Version of Record online: 06 January 2025), 1–24. https://doi.org/10.1111/epp.13054

European Commission (2022) Commission Implementing Regulation (EU) 2022/1372 of 5 August 2022 as regards temporary measures to prevent the entry into, the movement and spread within, the multiplication and release in the Union of *Meloidogyne graminicola* (Golden & Birchfield). *Official Journal of the European Union* L **206**/16. http://data.europa.eu/eli/reg_impl/2022/1372/oj

European Commission (2025) Commission Implementing Regulation (EU) 2025/1076 of 2 June 2025 amending Implementing Regulation (EU) 2022/1372 as regards the period of application of the measures to prevent the entry into, the movement and spread within, the multiplication and release in the Union of *Meloidogyne graminicola (* Golden & Birchfield), *Official Journal of the European Union* 2025/1076, http://data.europa.eu/eli/reg_impl/2025/1076/oj

European Union Reference Laboratory for Plant Parasitic Nematodes (2024) EURL Diagnostic Protocol for *Meloidogyne graminicola*. Morphological & Molecular Methods (Version 1). Zenodo. 48 pp. https://doi.org/10.5281/zenodo.14654535

Fanelli E, Cotroneo A, Carisio L, Troccoli A, Grosso S, Boero C, Capriglia F & De Luca F (2017) Detection and molecular characterization of the rice root-knot nematode *Meloidogyne graminicola* in Italy. *European Journal of Plant Pathology* **149**, 467–476. https://doi.org/10.1007/s10658-017-1196-7

Fanelli E, Gaffuri F, Troccoli A, Sacchi S & De Luca F (2022) New occurrence of *Meloidogyne graminicola* (Nematoda: Meloidogyninae) from rice fields in Italy: Variability and phylogenetic relationships. *Ecology and Evolution* **12**

(9), 1–14. https://doi.org/10.1002/ece3.9326

FAO (2017) International movement of used vehicles, machinery and equipment. International Standard for Phytosanitary Measures (ISPM) no. 41. International Plant Protection Convention, Food and Agriculture Organization of the United Nations. 11 pp.

Gaur HS (2003) Root-knot disease of rice and wheat: problem and management. *IARI, New Delhi Technical Bulletin* 23 pp. (TB – ICN: 1/2003).

Gheysen G & Mitchum MG (2011) How nematodes manipulate plant development pathways for infection. *Current Opinion in Plant Biology* **14**(4), 415–421. https:/doi.org/10.1016/j.pbi.2011.03.012

Golden AM & Birchfield W (1965) *Meloidogyne graminicola* (Heteroderidae), a new species of root-knot nematode from grass. *Proceedings of the Helminthological Society of Washington* **32**(2), 228–231.

Haque Z, Khan MR & Ahamad F (2018) Relative antagonistic potential of some rhizosphere biocontrol agents for the management of rice root-knot nematode, *Meloidogyne graminicola*. *Biological Control*, **126**, 109–116. https://doi.org/10.1016/j.biocontrol.2018.07.018.

Huong TTL, Padgham JL & Sikora RA (2009) Biological control of the rice root-knot nematode *Meloidogyne graminicola* on rice, using endophytic and rhizosphere fungi. *International Journal of Pest Management* **55**(1), 31–36. https://doi.org/10.1080/09670870802450235

Israel P, Rao YS & Rao YRVJ (1963) Investigations on nematodes in rice and rice soils. *Oryza* **1**, 125-127.

Italian NPPO (2023) Scheda tecnica per indagini sull'organismo nocivo *Meloidogyne graminicola*. *Servizio Fitosanitario Nazionale. Documenti Tecnici Ufficiali* **43**, 1–19. https://www.protezionedellepiante.it/wp-content/uploads/2023/07/dtu-n.-43-melggc_signed.pdf (Accessed 25 June 2025)

Jain RK, Khan MR & Kumar V (2012) Rice root-knot nematode (*Meloidogyne graminicola*) infestation in rice. *Archives of Phytopathology and Plant Protection* **45**(6), 635–645. http://dx.doi.org/10.1080/03235408.2011.588059

Kerry BR (1987) Biological control. In: *Principles and practice of nematode control in crops* (Ed. Brown RH & Kerry BR) pp. 233–263. 447 pp. Academic Press Australia, Marrickville, NSW, Australia.

Khan MR, Jain RK, Ghule TM & Pal S (2014) Root knot nematodes in India - a comprehensive monograph. *All India Coordinated Research Project on Plant Parasitic nematodes with Integrated approach for their Control*. Indian Agricultural Research Institute, New Delhi. pp. 78 + 29 plates.Kumari C, Dutta TK, Banakar P & Rao U (2016)Comparing the defence-related gene expression changes upon root-knot nematode attack in susceptible versus resistant cultivars of rice. *Scientific Reports* **6**, 22846. https://doi.org/10.1038/srep22846

Kyndt T, Denil S, Haegeman A, Trooskens G, Bauters L, Van Criekinge W, De Meyer T & Gheysen G (2012) Transcriptional reprogramming by root-knot and migratory nematode infection in rice. *New Phytologist* **196**(3), 887–900. https://doi.org/10.1111/j.1469-8137.2012.04311.x

López R (1991) Primer hallazgo de *Meloidogyne salasi* en arroz en la provincia de Guanacaste. *Agronomía Costarricense* **15**(1/2), 189–191. https://www.mag.go.cr/rev_agr/v15n1-2_189.pdf (Accessed 25 June 2025)

MacGowan JB & Langdon KR (1989) Hosts of the rice root-knot nematode *Meloidogyne graminicola*.

Nematology Circular No. 172. Florida Department of Agriculture and Consumer Services, Division of Plant Industry. https://www.fdacs.gov/content/download/10961/file/nem172.pdf (Accessed 25 June 2025)

Manser PD (1968) *Meloidogyne graminicola*, a cause of root-knot of rice. *FAO Plant Protection Bulletin* **16**(1), 1–11.

Mantelin S, Bellafiore S & Kyndt T (2017) *Meloidogyne graminicola*: a major threat to rice agriculture. *Molecular Plant Pathology* **18**(1), 3–15. https://doi.org/10.1111/mpp.12394

McClure MA (1977) *Meloidogyne incognita*: a metabolic sink. *Journal of Nematology* **9**(1), 88–90.

Medina A, Crozzoli R & Perichi G (2009) Nematodos fitoparásitos asociados a los arrozales en Venezuela. *Nematologia Mediterranea* **37**(1), 59–66.

Mulk MM (1976) *Meloidogyne graminicola*. *CIH description of plant-parasitic nematodes* set **6**, No. 87, 4 pp. Commonwealth Agricultural Bureau, UK.

Narasimhamurthy HB, Ravindra H, Mukesh Sehgal, Rani N, Suresha D, Ekabote & Ganapathi (2018) Biology and life cycle of rice root-knot nematode (*Meloidogyne graminicola*). *Journal of Entomology and Zoology Studies* **6**(1), 477–479. https://www.entomoljournal.com/achives/2018/vol6issue1/PartG/5-6-268-302.pdf (Accessed 25 June 2025)

Negretti RRD, Manica-Berto R, Agostinetto D, Thürmer L & Gomes C (2014) Host suitability of weeds and forage species to root-knot nematode *Meloidogyne graminicola* as a function of irrigation management. *Planta Daninha* **32** (3), 555–561. https://doi.org/10.1590/S0100-83582014000300011

Nugaliyadde L, Dissanayake DMN, Herath HUDN, Dharmasena CMD, Jayasundera DM & Ekanayake HMRK (2001) The outbreak of rice root-knot nematode, *Meloidogyne graminicola* in Nikewaratiya, Kurunegala in Maha 2000/2001. *Annals of the Sri Lanka Department of Agriculture* **3**, 373–374.

Padgham JL & Sikora RA (2007) Biological control potential and modes of action of *Bacillus megaterium* against *Meloidogyne graminicola* on rice. *Crop Protection* **26**(7), 971–977. https://doi.org/10.1016/j.cropro.2006.09.004

Padgham JL, Abawi GS & Duxbury JM (2003) Survival and infectivity of *Meloidogyne graminicola* in flooded and non-flooded soils. *Nematologia mediterranea* **31**(2), 225–230.

Padgham JL, Duxbury JM, Mazid AM, Abawi GS & Hossain H (2004) Yield loss caused by *Meloidogyne graminicola* on lowland rainfed rice in Bangladesh. *Journal of Nematology* **36**(1), 42–48.

Peng D, Haur HS & Bridge J (2018) Nematode parasites of rice. In: *Plant parasitic nematodes in subtropical and tropical agriculture*, 3rd ed. (Ed. Sikora RA, Coyne D, Hallmann J & Timper P), pp. 120–162. CABI Boston, MA, USA.

Plowright RA & Bridge J (1990) Effect of *Meloidogyne graminicola* (Nematoda) on the establishment, growth and yield of rice cv. IR36. *Nematologica* **36**(1-4), 81–89. https://doi.org/10.1163/002925990X00059

Pokharel RR, Abawi GS, Zhang, N, Duxbury JM & Smat CD (2007) Characterization of isolates of *Meloidogyne* from rice-wheat production fields in Nepal. *Journal of Nematology* **39**(3), 221–230.

Pokharel RR, Duxbury JM & Abawai G (2012) Evaluation of protocol for assessing the reaction of rice and wheat germplasm to infection by *Meloidogyne graminicola*. *Journal of Nematology* **44**(3), 274–283.

Prasad JS & Somasekhar N (2009) Nematode Pests of Rice: Diagnosis and Management. *Technical Bulletin No. 38, Directorate of Rice Research (ICAR)*, Rajendranagar, Hyderabad – 500030, A.P. India. 29 pp.

Prasad JS, Panwar MS & Rao YS (1985) Occurrence of root knot-nematode *Meloidogyne graminicola* in semideepwater rice. *Current Science* **54**(8), 387–388.

Prot JC, Soriano IRS & Matias D (1994) Major root-parasitic nematodes associated with irrigated rice in the Philippines. *Fundamental and Applied Nematology* **17**(1), 75–78.

Rao YS, Prasad JS & Panwar MS (1986) Nematode problems in rice: crop losses, symptomatology and management. In: *Plant Parasitic Nematodes of India: Problems and Progress* (Ed. Swarup G & Dasgupta DR), pp. 279-299. Indian Agricultural Research Institute, New Delhi, India.

Rao YS, Prasad JS, Yadav CP & Padalia CR (1984) Influence of rotation crops in rice soils on the dynamics of parasitic nematodes. *Biological Agriculture & Horticulture* **2**(1), 69–78. https://doi.org/10.1080/01448765.1984.9754415

Rich JR, Brito JA, Kaur R & Ferrell JA (2009) Weed species as hosts of *Meloidogyne*: a review. *Nematropica* **39**, 157–185.

Roy AK (1982) Survival of *Meloidogyne graminicola* eggs under different moisture conditions *in vitro*. *Nematologia Mediterranea*, **10**(2), 221–222.

Rusinque L, Maleita C, Abrantes I, Palomares-Rius JE & Inácio ML (2021) *Meloidogyne graminicola* - A threat to rice production: review update on distribution, biology, identification, and management. *Biology* **10**(11), 1163, 1–19. https://doi.org/10.3390/biology10111163

Sacchi E, Brenna S, Fornelli Genot S, Leoni A, Sale VM & Setti M (2020) Potentially Toxic Elements (PTEs) in cultivated soils from Lombardy (Northern Italy): spatial distribution, origin, and management implications. *Minerals* **10**(4), 298, 1–20. https://doi.org/10.3390/min10040298

Sacchi S, Torrini G, Marianelli L, Mazza G, Fumagalli A, Cavagna B, Ciampitti M & Roversi PF (2021). Control of *Meloidogyne graminicola* a root-knot nematode using rice plants as trap crops: preliminary results. *Agriculture* **11** (1), 37, 1–9. https://doi.org/10.3390/agriculture11010037

Sancho LS, Salazar L & López R (1987) Efecto de la densidad inicial del inoculo sobre la patogenicidad de *Meloidogyne salasi* en tres cultivares de arroz. *Agronomia Costarricense* **11**(2), 233-238.

Simon S & Anamika A (2011) Management of root knot disease in rice caused by *Meloidogyne*. *Journal of Agricultural Science, Canadian Center of Science and Education* **3**(1), 122–127.

Somasekhar N & Prasad JS (2009) Root-knot nematode *Meloidogyne graminicola* **-** An emerging threat to rice cultivation. *DRR Newsletter* **7**, 3–4.

Soomro MH (1989) Survival of rice root-knot nematode juveniles in moist soil. *International Rice Research Newsletter*. **14**, 35.

Soomro MH (1994) Some observations on the survival and viability of *Meloidogyne graminicola* in the absence of any host. *Pakistan Journal of Nematology* **12**(2), 137–140.

Soriano IR & Reversat G (2003) Management of *Meloidogyne graminicola* and yield of upland rice in South-Luzon, Philippines. *Nematology* **5**(6), 879–884. https://doi.org/10.1163/156854103773040781

Soriano IR, Prot JC & Matias DM (2000) Expression of tolerance for *Meloidogyne graminicola* in rice cultivars as affected by soil type and flooding. *Journal of Nematology* **32**(3), 309-317.

Tandingan IC, Prot JC & Davide RG (1996) Influence of water management on tolerance of rice cultivars for *Meloidogyne graminicola*. *Fundamental and Applied Nematology* **19**(2), 189–192.

Tiilikkala K, Carter T, Heikinheimo M & Venalainen A (1995) Pest risk analysis of *Meloidogyne chitwoodi* for Finland. *Bulletin OEPP/EPPO Bulletin* **25**(3), 419–435. https://doi.org/10.1111/j.1365-2338.1995.tb00576.x

Torrini G, Roversi PF, Cesaroni CF & Marianelli L (2020) Pest risk analysis of rice root?knot nematode (*Meloidogyne graminicola*) for the Italian territory. *Bulletin OEPP/EPPO Bulletin* **50**(2), 330–339. https://doi.org/10.1111/epp.12666

Triantaphyllou AC (1969) Gametogenesis and the chromosomes of two root-knot nematodes, *Meloidogyne graminicola* and *M. naasi*. *Journal of Nematology* **1**(1), 62–71.

Win PP, Kyi PP & De Waele D (2011) Effect of agro-ecosystem on the occurrence of the rice root-knot nematode *Meloidogyne graminicola* on rice in Myanmar. *Australasian Plant Pathology* **40**(2), 187–196. https://doi.org/10.1007/s13313-011-0029-y

Win PP, Kyi PP, Maung ZTZ & De Waele D (2013) Population dynamics of *Meloidogyne graminicola* and *Hirschmanniella oryzae* in a double rice-cropping sequence in the lowlands of Myanmar. *Nematology* **15**(7), 795–807. https://doi.org/10.1163/15685411-00002719

Yik CP & Birchfield W (1979) Host studies and reactions of rice cultivars to *Meloidogyne graminicola*. *Phytopathology* **69**(5), 497-499.

ACKNOWLEDGEMENTS

This datasheet was prepared in 2025 by Giovanna Curto, Regional Plant Protection Service, Emilia-Romagna (Italy). Her valuable contribution is gratefully acknowledged.

How to cite this datasheet?

EPPO (2025) *Meloidogyne graminicola*. EPPO datasheets on pests recommended for regulation. Available online. https://gd.eppo.int

Datasheet history

This datasheet was first published in the EPPO Bulletin in 2025. It is maintained in an electronic format in the EPPO Global Database. The sections on 'Identity', ‘Hosts’, and 'Geographical distribution' are automatically updated from the database. For other sections, the date of last revision is indicated on the right.

EPPO (2025) Datasheets on pests recommended for regulation. *Meloidogyne graminicola*. . *EPPO Bulletin* **55**(2), 242-249. https://doi.org/10.1111/epp.70005