GRASSES AS HOSTS OF *MELOIDOGYNE NAASI* FRANKLIN: 
I. VARIATION IN HOST STATUS OF SPECIES AND 
VARIETIES GROWN IN FRANCE

by

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The host status of different grass species for *M. naasi* has been studied in experiments with 
infested soil.

Italian ryegrasses produced most females or eggs per g of root. The host status of perennial 
and hybrid ryegrasses was similar but better than that of the varieties of meadow fescue tested. 
Tall fescue and cocksfoot were poor hosts of the nematode. The development of few females on 
tall fescue cv. Pastelle, may be due either to the death of second stage juveniles in roots or to 
their migration into the soil.

Increasing infestation level led to greater production of females and eggs in three species of 
ryegrasses but did not affect the poor host quality of tall fescue.

*Keywords*: host parasite relations, root knot nematode, resistance, *Lolium* spp., *Festuca* spp., 
*Dactylis glomerata*.

Grasses are good hosts of *Meloidogyne naasi* Franklin and this root-knot 
nematode may become a serious problem on crops following grasses viz. barley 
(Gooris & D’Herde, 1969; Cook & York, 1984), sugarbeet (Gooris & D’Herde, 
1969), and other cereals (Caubel *et al.*, 1971). Where grass forage production 
is economically important, a knowledge of the reaction of grasses to the 
nematode will permit selection of crops which will control the nematode 
population.

Many grasses have been reported as hosts of this nematode, 18 species by 
Mitchell *et al.* (1973) and 40 by Gooris & D’Herde (1977). However few studies 
have been made of the extent of their susceptibility to *M. naasi*. Cook *et al.* 
(1981) have shown that ryegrasses are the best hosts, with Italian ryegrasses 
more susceptible than perennials, while cocksfoot and timothy are poor hosts. 
This work has demonstrated variation in the host response.

Consequently, tests to evaluate host susceptibility to *M. naasi* have been 
made to determine the species and varieties which are poor hosts under the 
agricultural and climatic conditions prevailing in France. For this, the 
development of females and eggs of *M. naasi* on the roots of different grasses 
was studied.
MATERIALS AND METHODS

Infested soils were collected in September after one or two crops of winter wheat in Le Rheu (Ille et Vilaine). Two levels of infestation were used: very low in 1982 (about one second stage juvenile (J2) per g of soil) and high in 1983 and 1985 (between 11 and 14 J2 per g of soil).

Six species of grasses were studied: Lolium multiflorum Lam., Italian ryegrass; Lolium perenne L., perennial ryegrass; Lolium X hybridum Hauss. Kn, hybrid ryegrass; Festuca arundinacea Schreb., tall fescue; Festuca pratensis Huds, meadow fescue, and Dactylis glomerata L., cocksfoot. The varieties chosen were registered in France in the 1985 official list of species of cultivated plants. (Annexe au Journal officiel des communautés européennes, catalogue commun des variétés des espèces agricoles, 11ème édition).

Three trials were carried out with different objects in view.

Experiment 1982 made a first assessment of variation in host status of species and varieties of grasses grown at low inoculum density (1 J2). These first results were the foundation of both following trials. Five pots each of the cultivars listed in Table I were sown with 10 seeds per pot on April 1st. The experiment was assessed from July 26 to 29th, when root systems were washed and the nematodes extracted and counted in a 5 g subsample of roots per pot.

Experiment 1983 was made especially to study the grasses which were poor hosts of the nematode. The grasses detected as partially resistant in 1982 were sown with a different level of infestation (11 J2). Cocksfoot, reportedly a poor host (Cook et al., 1981) was also included in this trial. Additional analyses were made during this experiment to give supplementary information concerning the relationships between these grasses and the nematode.

This experiment was sown with 10 seeds per pot on April 28th: there were 5 pots of each of the 9 cultivars listed in Table III, with an additional 15 pots each of cvs Pastelle and Promenade. At 55, 64 and 71 days after sowing 5 replicates of these two grasses were analysed: root systems were washed, 40 galls selected and nematodes extracted and counted. All cultivars were assessed on August 22nd and 23rd when nematodes were extracted and counted from all the roots.

Experiment 1985 was a more extensive study of the grasses identified as good hosts of *M. naasi*. This experiment had 10 replicates of the cultivars listed in Table II, was sown on April 1st and assessed by counting nematodes in all the roots in each pot, from 24 to 26th July.

All experiments were established identically.

The infested soil was kept outside during the winter in pots (8 cm diam.) containing 1 l soil. The pots were laid out in a block for each cultivar, with species grouped together. All pots were covered with a thin layer of a sand/soil mixture and watered every day outside rainy periods. The plants were provided with a solution of major nutrient elements (N, P₂O₅, K₂O) once a month.