



## Meloidogyne graminicola- A Threat to Rice Cultivation

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### INTRODUCTION

Rice is the staple food of more than half of the world's population and more than 3.5 billion people depends on rice for more than 20 percent of their daily calories. In Asia, more than 90% of the world's rice is consumed. In India, rice is extensively cultivated and it occupies about 23.3% of the gross cropped area of the country, covering about 43 million hectares of land (Food and Agriculture Organization of the United Nations 2018). Rice cultivation play an important role in India, by contributing towards 43% of the total food grain production and 46% of the total cereal production.

In the year 2016 India, produced 15.88 million tons of rice, with an average productivity of 3695 kg/ha, which is 25.5% lower than the global average rice productivity of 4,637kg/ha (Food and Agriculture Organization of the United Nations 2018). The lower productivity of rice may be due to various biotic and abiotic factors. Among the biotic factors, plant parasitic nematodes are considered as an important factor of low productivity in rice. A number of plant parasitic nematodes viz., *Ditylenchus angustus*, *Aphelenchoides besseyi*, *Hirschmanniella* spp., *Heterodera oryzicola* and *Meloidogyne graminicola* are reported from rice. Amongst these, most damaging nematode pest of rice are *M. graminicola*, the root rot nematode *Hirschmanniella oryzae* and the cyst nematode *Heterodera* spp. Till date, *M.graminicola* is considered as a primary nematode pest of rice and poses a substantial threat to major rice producing country particularly, Southeast Asia, where, around 90% of the world rice is grown and consumed (Dutta et al., 2012). This nematode can cause substantial growth retardation in rice seedlings and cause around 80% yield loss in aerobic rice, low land rice and deep water rice in Southeast Asia and other rice growing region.

*M. graminicola* is prevalent in major rice growing countries of the world, distributed in the countries of South East Asia, Burma, Bangladesh, Laos, Thailand, Vietnam, India, China, Philippines, Nepal and USA. In India, *M. graminicola* is found to distribute in the state of Assam, Andhra Pradesh, Karnataka, West Bengal, Orissa, Kerala, Tripura and Madhya Pradesh (Prasad et al., 1987). They not only cause a serious problem in upland rice and nurseries but also found to be wide spread in deepwater and irrigated rice of many states of India. This nematode was reported from irrigated rice in Andhra Pradesh (Sharma & Prasad, 1995) and Karnataka (Krishnappa et al., 2001; & Prasad et al., 2001).

*M. graminicola* produces galls at the roots tip with characteristics hook shaped which impair the root development and physiology of the

plant (Fig,1). The disruption in the transportation of water and nutrient due to the alteration of root morphology lead to the development of above ground symptom such as stunting, chlorosis and loss of vigour, which results in poor growth and development along with substantial yield losses in rice plants that can represent up to 87 percent of production (Lilley et al., 2011). In the field, these losses may be exacerbated in combination with other biotic or abiotic stresses, such as drought. Thus *M. graminicola* become a severe production constraint to rice-growing countries and is likely to be an underestimated pathogen because of the lack of specific above-ground symptoms that can lead growers to wrongly attribute the damage to nutritional and water-associated disorders or to secondary diseases.



**Fig. 1: Galls developed due to *M.graminicola***

### CONCLUSION

In the era of globalization, the area under rice cultivation is decreasing therefore it is need of the time to increase the productivity of rice to meet the demand of growing population. The productivity of rice is affected by several biotic and abiotic stresses, of which, plant parasitic nematodes considered as an important production constrain. Therefore, it is

necessary to carry out the survey programme to study the distribution pattern of *M.graminicola* in rice crop and also to identify the nematode in order to adopt appropriate management practices as many a time probable yield loss caused by the nematodes are ignored due to it's microscopic nature. Otherwise in near future this nematode can cause havoc to rice cultivation due to the

unique characteristics of nematodes to withstand the adverse environmental condition.

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