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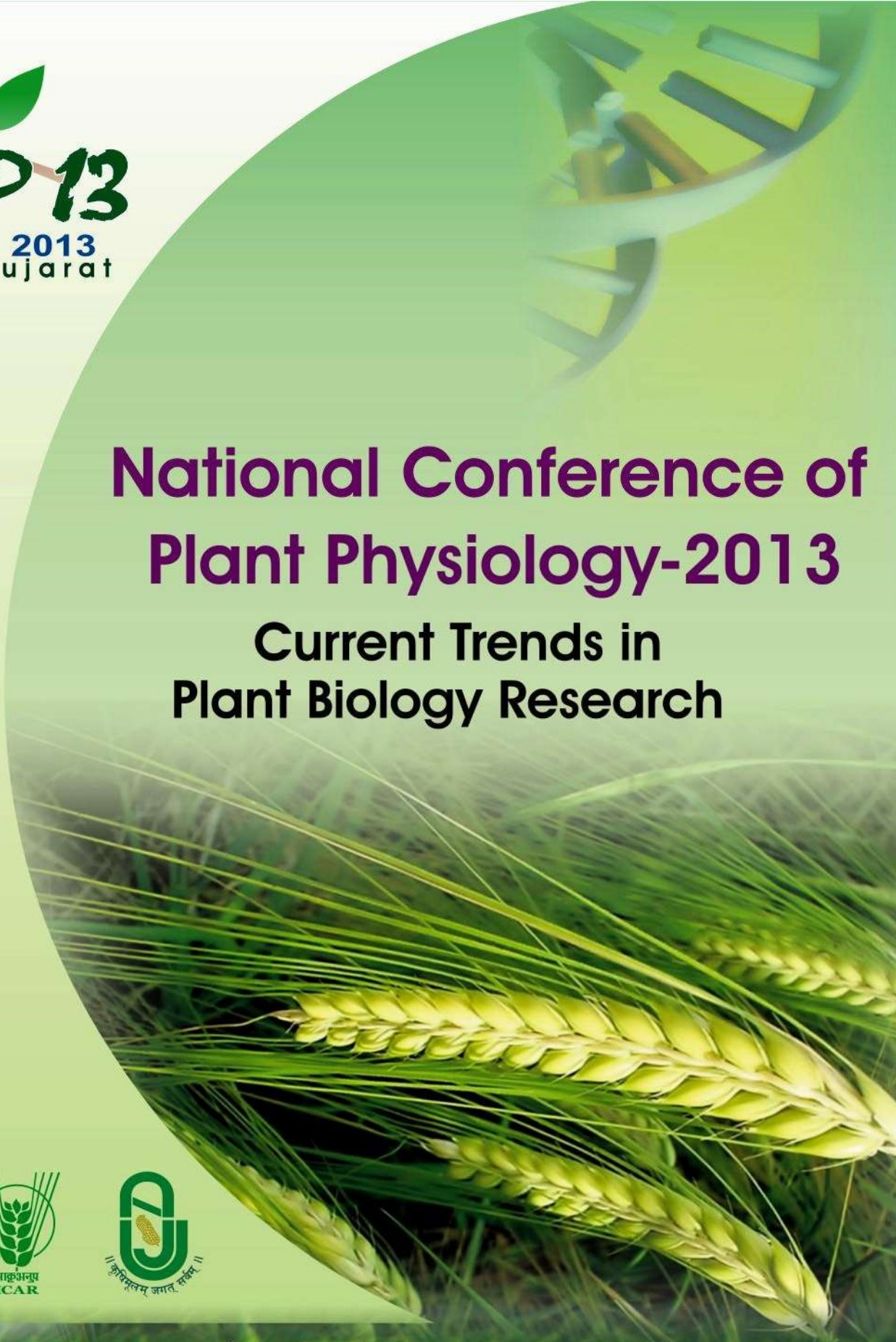

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P 2-42. DAMAGE POTENTIAL OF ROOT-KNOT NEMATODES, *MELOIDOGYNE ARENARIA* AND *M. INCOGNITA* IN GROUNDNUT AND THEIR RELATION TO REACTIVE OXYGEN SPECIES MODULATION

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INTRODUCTION

Root-knot nematodes *viz*., *Meloidogyne arenaria* Neal, 1889 *M. javanica* Treub 1885, *M. incognita* Kofoid and White, 1919 and *M. hapla* Chitwood, 1949 are distributed throughout groundnut growing areas of world and are the most destructive soil dwellers limiting groundnut yield. In a recent survey of groundnut growing areas of Rajkot district, Gujarat, India, infection of *M. arenaria* and *M. incognita* were detected. The damage associated with *M. araeneria* on groundnut includes yellowing, stunted growth and moderate galling. However, *M. incognita* infected plants have very mild stress symptoms or no symptoms seen at all. Hence, the present study was undertaken to know damage and reproductive potential of root-knot nematodes, *Meloidogyne arenaria* and *M. incognita* and their relation to reactive oxygen species modulation in groundnut.

MATERIAL AND METHODS

Nematode reproductive and damage potential assay

The root-knot nematodes, *M. areneria* and *M. incognita* infested soil is mixed with sterilised soil to get a population density of 100 and 1000 J2/100cc soil before filling in to the 15 cm diameter earthen pot. The treatments consist of two levels of each nematode (low = 100 J2/100 cm^3 of soil; high = 1000 J2/ 100 cm^3 of soil) along with uninoculated control. Each treatment was replicated eight times. The seeds of groundnut (GG 20) sown in the pot and crop was harvested 90 days after sowing. Root galling and total number of egg-mass was recorded. Soil populations of nematode were monitored after extraction of nematode from 200 cc of soil by Cobb's decanting and sieving technique followed by modified Baermann's funnel technique.

Determination of reactive oxygen species

The content of lipid peroxidation (measured in TBARS content), hydrogen peroxide and super oxide radical contents were determined at 40 and 80 days after sowing (DAS) in the leaves of groundnut.

RESULTS AND DISCUSSION

Significantly higher number of gall and egg-mass were produced in the treatment with high level (1000 J2/ 100 cm3 of soil) of *M. areneria* inoculation compared to other treatments. No significant differences in nematode populations were observed at the time of harvest irrespective of nematode species and inoculation level. Observations on plant growth characteristics revealed that significantly shortened root length, lower fresh root and dry root weight in the treatment with high level (1000 J2/ 100 cm3 of soil) of *M. areneria* compared to other treatments.

The infection of root-knot nematode, *M. incognita* at high level (1000 J_2/ 100 cm^3 of soil) resulted insignificantly increased H_2O_2 (109.53g^{-1} fresh weight), super oxide radical (3.18g^{-1} fresh weight) and TBARS content (23.27g^{-1} fresh weight) compared to 68.25, 0.37 and 15.53g^{-1} fresh weight respectively in un-inoculated control. It is known that increase in reactive oxygen

species is typically associated with hypersensitive response in incompatible host-pathogen interactions including nematode–plant interactions and increased in H_2O_2 is believed to play roles in pathogenesis, restriction of pathogen growth and induction of phytoalexins and PR proteins (De Gara et al., 2003; Levine et al., 1994). However, root-knot species exhibit a considerable level of variability in terms of host range and virulence on varieties of a host species (Roberts, 1995). Difference in genetic makeup of the two species of nematodes may be responsible for differential behavior in groundnut.

CONCLUSIONS

Root-knot nematode, *M. areneria* is more damaging and pathogenic than *M. incognita.* Increased level of reactive oxygen species in response *M. incognita* infection may contribute to the resistance/or incompatible reaction in groundnut.

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