



Screening of banana hybrids for resistance to *Pratylenchus coffeae*

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ABSTRACT

The reaction of twenty-four new synthetic banana hybrids to *Pratylenchus coffeae* was studied under artificially inoculated pot conditions. Two banana hybrids, H-04-05 and H-04-06 were found to be resistant and ten hybrids, H-04-01, H-04-03, H-04-04, H-04-07, H-04-09, H-04-11, H-04-16, H-04-19, H-04-21 and H-04-24 were found to be tolerant to the lesion nematode, *Pratylenchus coffeae* and the remaining were rated as susceptible.

Keywords : Resistance, banana, hybrids, *Pratylenchus coffeae*

INTRODUCTION

Crop losses in bananas caused by nematodes are very high, with an average annual yield loss estimated at about 20 per cent worldwide (Sasser and Freckman, 1987). Two of the most widespread and important nematode species associated with bananas and plantains are the burrowing nematode *Radopholus similis* and the lesion nematode *Pratylenchus coffeae*. These lesion-inducing nematodes feed, multiply and migrate inside the roots and corm and cause a necrotic and reduced root system. Hence, it is important to screen the cultivars or hybrids for their reaction to nematodes. In light of the above, the present study was undertaken at Horticultural College and Research Institute, Tamil Nadu Agricultural University, Coimbatore, India.

MATERIAL AND METHODS

Banana hybrids used in the present study were evolved in the institute with the main objective of breeding for resistance/tolerance to nematodes along with good yield traits. The hybrids were assessed for their reaction to lesion nematode, *Pratylenchus coffeae*. The experiments were conducted in a glass house in potted plants which were inoculated artificially. The experiment was laid out in randomised block design and replicated thrice. The hybrids were evaluated along with the reference cultivars viz., Rasthali (AAB, syn.silk) as the susceptible reference cultivar and Pisang Lilin (AA) as the resistant reference cultivar. The screening was done based on the root and corm

damage assessment as followed in INIBAP technical guidelines 7 (Carlier *et al.*, 2003).

Preparation of plant material

Suckers of uniform size were pared immediately after detaching from the mother plant, and planted in pots filled with sterilized pot mixture. The soil was watered upto field capacity. Four weeks after planting, 8-10 plants of each genotype were inoculated with lesion nematodes (1 nematode per gram of soil), while another set of 8-10 plants were kept as nematode-free control.

Culturing and extraction of nematodes

Carrot disc culture

Surface sterilized carrot was cut into discs and placed in sterile petri dishes. Nematodes extracted from the infected roots through Baermann-funnel method were surface sterilized and transferred to the carrot discs with a sterile micropipette. Small drops of nematode suspension were placed on the margin of the carrot discs. The petri dishes were sealed with parafilm, labelled and stored in an incubator at 28°C. Sub-culturing of nematodes on fresh carrot discs was done periodically and the extracted nematodes were used for inoculation in pot culture experiments (Carlier *et al.*, 2003).

Inoculation of nematodes in pots

Nematode suspension obtained from the above method, containing infective juveniles of *Pratylenchus coffeae*, were inoculated into the pots, forty five days after

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eventually editor of the series Alec is an excellent orchid scientist and editor I was sorry to that he had to leave OB but glad that GO will be in his able hands The first volume of GO attests to his considerable abilities and I wish him much success in the future Editors of orchid publications are not the most common of species to use a botanical analogy and finding a replacement for Alec was not easy However I was fortunate that Dr Tiiu Kull agreed to become my co editor and eventually take over the series As is obvious from the Contributors section Dr Kull has extensive experience as both writer and editor My interactions with her while editing this volume have convinced me she is an excellent choice Scientifically she brings to OB an appreciation and understanding of northern terrestrial orchids a group which has not received as much attention as it deserves Another addition to OB is Dr Tim Wing Yam who agreed to become an associate editor Tim who holds a position at the Singapore Botanic Gardens will provide expertise on seed germination hybridization tissue culture species and conservation

Plant Tissue Culture Roberta H. Smith, 2013 Plant Tissue Culture Third Edition builds on the classroom tested audience proven manual that has guided users through successful plant culturing A tumefaciens mediated transformation infusion technology the latest information on media components and preparation and regeneration and morphogenesis along with new exercises and diagrams provide current information and examples The included experiments demonstrate major concepts and can be conducted with a variety of plant material that are readily available throughout the year This book provides a diverse learning experience and is appropriate for both university students and plant scientists Provides new exercises demonstrating tobacco leaf infiltration to observe transient expression of proteins and subcellular location of the protein and information on development of a customized protocol for protoplast isolation for other experimental systems Includes detailed drawings that complement both introductions and experiments Guides reader from lab setup to supplies stock solution and media preparation explant selection and disinfection and experimental observations and measurement Provides the latest techniques and media information including A tumefaciens mediated transformation and infusion technology Fully updated literature

Micropropagation of Orchids Joseph Arditti, 2009-01-26 This greatly expanded and updated edition of a classic reference work comprises two volumes offering a compendium of methods for multiplying orchids through micropropagation A detailed collection of procedures and methods for multiplying orchids including organ tissue and cell culture techniques in vitro Presents classic techniques that have been in the forefront of orchid propagation since they were first developed in 1949 Detailed procedures are appended with tables and complete recipes for a large number of culture media Includes many illustrations chemical formulas historical vignettes and seldom seen illustrations of people orchids apparatus and tools an excellent resource like its predecessor both informative and captivating and served as a reminder of why we go to such extremes in our quest to propagate these plants American Orchid Society 2009 in the sense of its universal value and importance this Second Edition will undoubtedly be considered a classic if only because it will serve as a sole and invaluable resource on the subject Plant Science Bulletin 2009

The Journal of Pomology and Horticultural Science, 1932 *Plant Biology and Biotechnology* Bir Bahadur, Manchikatta Venkat Rajam, Leela Sahijram, K.V. Krishnamurthy, 2015-07-02

This volume offers a much needed compilation of essential reviews on diverse aspects of plant biology written by eminent botanists. These reviews effectively cover a wide range of aspects of plant biology that have contemporary relevance. At the same time they integrate classical morphology with molecular biology, physiology with pattern formation, growth with genomics, development with morphogenesis, and classical crop improvement techniques with modern breeding methodologies. Classical botany has been transformed into cutting edge plant biology, thus providing the theoretical basis for plant biotechnology. It goes without saying that biotechnology has emerged as a powerful discipline of Biology in the last three decades. Biotechnological tools, techniques, and information used in combination with appropriate planning and execution have already contributed significantly to economic growth and development. It is estimated that in the next decade or two, products and processes made possible by biotechnology will account for over 60% of worldwide commerce and output. There is therefore a need to arrive at a general understanding and common approach to issues related to the nature, preservation, and use of biodiversity as it provides the raw material for biotechnology. More than 90% of the total requirements for the biotechnology industry are contributed by plants and microbes in terms of goods and services. There are, however, substantial plant and microbial resources that are waiting for biotechnological exploitation in the near future through effective bioprospection. In order to exploit plants and microbes for their useful products and processes, we need to first understand their basic structure, organization, growth, and development, cellular process, and overall biology. We also need to identify and develop strategies to improve the productivity of plants. In view of the above, in this two volume book on plant biology and biotechnology, the first volume is devoted to various aspects of plant biology and crop improvement. It includes 33 chapters contributed by 50 researchers, each of which is an expert in his or her own field of research. The book begins with an introductory chapter that gives a lucid account on the past, present, and future of plant biology, thereby providing a perfect historical foundation for the chapters that follow. Four chapters are devoted to details on the structural and developmental aspects of the structures of plants and their principal organs. These chapters provide the molecular biological basis for the regulation of morphogenesis of the form of plants and their organs, involving control at the cellular and tissue levels. Details on biodiversity, the basic raw material for biotechnology, are discussed in a separate chapter in which emphasis is placed on the genetic species and ecosystem diversities and their conservation. Since fungi and other microbes form an important component of the overall biodiversity, special attention is paid to the treatment of fungi and other microbes in this volume. Four chapters respectively deal with an overview of fungi, arbuscular mycorrhizae and their relation to the sustenance of plant wealth, diversity, and practical applications of mushrooms and lichens associated with a photobiont, microbial endosymbionts associated with plants, and phosphate solubilizing microbes in the rhizosphere of plants, which are exhaustively treated in two separate chapters. The reproductive strategies of

bryophytes and an overview on Cycads form the subject matter of another two chapters thus fulfilling the need to deal with the non flowering Embryophyte group of plants Angiosperms the most important group of plants from a biotechnological perspective are examined exhaustively in this volume The chapters on angiosperms provide an overview and cover the genetic basis of flowers development pre and post fertilization reproductive growth and development seed biology and technology plant secondary metabolism photosynthesis and plant volatile chemicals A special effort has been made to include important topics on crop improvement in this volume The importance of pollination services apomixes male sterility induced mutations polyploidy and climate changes is discussed each in a separate chapter Microalgalnutra pharmaceuticals vegetable oil based nutraceuticals and the importance of alien crop resources and underutilized crops for food and nutritional security form the topics of three other chapters in this volume There is also a special chapter on the applications of remote sensing in the plant sciences which also provides information on biodiversity distribution The editors of this volume believe the wide range of basic topics on plant biology that have great relevance in biotechnology covered will be of great interest to students researchers and teachers of botany and plant biotechnology alike

Plant Tissue Culture Robert H. Smith,2012-12-02
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