Occurrence of entomopathogenic nematodes in Assam

Rimi Deuri, Anil Kumar Jena, Pranamika Sharma, Tara Bhuyan, Surya Prakash Singh and Toyir Nyori

Abstract

The enormous use of pesticides is not only costly affair but also its residual effects are harmful for animals and human beings and to minimize the use of pesticides, it is required to find out such control measures that could reduce not only the application of this huge quantity of the pesticides but also could be eco-friendly. Entomopathogenic nematodes occur naturally in the environment as parasites of many insect larvae. Heterorhabditis and Steinernematis have mutualistic association with the bacteria of the genera Photorhabdus and Xenorhabdus, respectively which are lethal parasites of soil dwelling insects. The mass release of these nematodes provides an efficient and curative control of key insect pests in a wide range of crops. A large number of Entomopathogenic nematode Steinernema as well as Heterorhabditis nematodes have been reported by Nematoologist from this area from around the root zones different plants. This review aims to explore the occurrence of entomopathogenic nematode species in Assam.

Keywords: Assam, Heterorhabditis sp., Steinernema sp and Lepidiota mansueta

Introduction

Assam, situated between 28°18’N and 24 N latitude and 89°46’E and 97°4’E longitudes, is considered as one of the richest bio-diversity zones of the world. A large number of plant parasitic, Entomopathogenic nematodes and free living nematodes were reported from Assam. The large variability in EPN occurrence can also be increased due to insect host aggregation [1]. The state has fertile and loam to sandy loam soil and good vegetation cover. These conditions in addition to adequate rain that generally supported the survival and prevalence of host insects and ultimately high occurrence of EPNs especially in fruit crops due to shade and higher moisture under the big canopy of the tree.

Present Scenario of Entomopathogenic nematodes in Assam

Nematodes in genera Steinernema and Heterorhabditis are considered as potentially available biological control agents against insect pest. They are widely distributed infecting more than 250 different species of insects belonging to 10 orders [2]. Several species of entomopathogenic nematodes are successfully mass-produced and are commercially available to the farmers. These EPN are environmentally safe and there is no problem of insect resistance. entomopathogenic nematodes are exempted from the Environmental Protection Act (EPA) due to their safety to non-target organisms. Indigenous entomopathogenic nematodes may be more suitable for inundative release against local insect pests because of their adaptability to local climate [3]. The first entomopathogenic nematode was described by Steiner as Aplectana kraussei in 1923. Glaser and Fox in 1930 isolated Neaoplectana glaseri to control populations of the Japanese beetle that had invaded New Jersey.

Steinernema and Heterorhabditis have been isolated from Indian soil by various worker [4]. Indigenous isolates of entomopathogenic nematodes have been isolated from different Indian States or Union Territories, viz., Assam [5], Andaman & Nicobar Islands [6], Gujarat [7], Karnataka [8], Kerala [9], New Delhi [10], Tamil Nadu [11], Uttar Pradesh [12], and Uttarakhand [13]. So far, 11 species of Steinernema and 2 species of Heterorhabditis have been reported besides a number of unidentified isolates. Among the indigenous isolates, four have been described as a new species, S. thermophilum from New Delhi [14], H. bacteriophora [15], Identified S. abbasi, S. tami and an undescribed Steinernema sp Steinernema and Heterorhabditis from different habitat viz., fruit, ornamental, field and plantation crops of Assam and The percent of
occurrence of Steinernema and Heterorhabditis were 19.73% and 19.72% respectively [16, 17] isolates Heterorhabditis and Steinernema from dead grubs of white grub (Lepidiota mansueta) endemic field of Majuli river Island, Assam, India and based on morphometric and cross- breeding studies, the Heterorhabditis isolates were identified as H. bacteriophora.

Conclusion
This indicates their potential role in the natural control of soil inhabiting insect pests which are of immense economic importance. Further studies on the characterization and host ranges of these EPN species are necessary to explore and ascertain their possible utilization in a biological control programme of this economically important pest.

Acknowledgement
We thank to Arunachal University of Studies for providing facilities in the Department of Agriculture, during this study.

References