

Environmental and Social Safeguards/ issues & mitigation strategies

Project title: Understanding plant-nematode interactions using RNAi

1. Basic information

A. Project Data

Project Statistics:

Total cost: Rs.558.879 lakh

Duration: Four years three months

Location: Kanpur and New Delhi

- **Consortium Leader** : Indian Institute of Technology, Kanpur
- **Consortium Partners:** NRCPB, IARI , New Delhi
: IARI, New Delhi
: Indian Institute of Pulses Research, Kanpur

- **Consortium PI:** Dr. K. Subramaniam
- **Consortium CoPI:** Dr. P. K. Jain
: Dr. Anil Sirohi
: Dr. Nandeesh P.

Project Objectives

I. Functional genomics:

A. Functional characterization of root-knot nematode genes – specifically, genes that encode secreted proteins; genes involved in the development of embryo, larva, intestine, neuromuscular system.

B. Identification of nematode-responsive root-specific plant promoters

II. Identification of minimum sequence similarity required for RNAi response in root-knot nematodes

III. Demonstration of proof-of-principle in crops: Test whether nematode-specific dsRNA expression in tomato (A) and field pea (B) will elicit RNAi in root-knot nematodes

Brief Project Description

Plant-parasitic nematodes (PPNs) cause significant loss – depending upon the crop, 10-40% yield loss – to agriculture. However, due to their parasitic nature, traditional genetic and biochemical tools could not be employed for the discovery of PPN gene function. As a consequence, the biology of PPNs is currently poorly understood. This, in turn, has become a major bottleneck for the development of environmentally safe and effective PPN management strategies. The project aims to take advantage of the sequence information available for the root-knot nematodes (RKNs) – the most devastating of all PPNs – and apply modern reverse genetic methods to discover the functions of RKN genes.

B. Environmental Category

2. Major issues in the subproject

- Social:
This project addresses basic science problems within the confines of laboratory, so the implementation of the project does not have any social issues.
- Environmental:
As mentioned above, all activities of this project will be within the confines of laboratory, so impact on the environment is expected.

3. Safeguard Policies Triggered (World Bank Policies)

Safeguard Policies Triggered (World Bank Policies)		
	Yes	No
Environmental Assessment (OP/BP 4.01)	[X]	[]
Natural Habitats (OP/BP 4.04)	[]	[X]
Pest Management (OP 4.09)	[X]	[...]
Cultural Property (draft OP 4.11-OPN 11.03 -)	[]	[X]
Involuntary Resettlement (OP/BP 4.12)	[]	[X]
Indigenous Peoples (OD 4.20)	[]	[X]
Forests (OP/BP 4.36)	[]	[X]
Safety of Dams (OP/BP 4.37)	[]	[X]
Projects in Disputed Areas (OP/BP 7.60)	[]	[X]
Projects on International Waterways (OP/BP 7.50)	[]	[X]

The above triggers are solely because the experiments planned will involve the use of transgenic plants and nematode pests. However, all procedures will be exclusively handled within the confines of approved research laboratories by following DBT's guidelines for biosafety.

4. **Risk related Issues** (not covered under 3 above but perceived to be important in the sub project)

One of the possible outcomes of this project is the generation of plants carrying nematode gene. Therefore, these will have to be taken through approved safety tests before any field trials. No such trials are planned as part of the current project. Even otherwise, the consortium scientists do not plan to carry out such trials within the duration of this project.

5. Impact Assessment

Table 1: Environmental Safeguard : Activities, Issues, Impact and mitigation Measures

Activities	Issues	Activated level of impacts		Mitigation
		Positive	Negative	
Research involving GMOs	Development of resistance in pests	0	0	All GMOs will be handled within the confines of research laboratories only. They will be totally destroyed before disposal to external environment.
	Human health through food chain	0	0	All GMOs will be handled within the confines of research laboratories only. They will be totally destroyed before disposal to external environment.

Table 2 : Social Safeguard : Activities,Issues, Impact and mitigation Measures

Activities	Issues	Activated level of impacts		Mitigation
		Positive	Negative	

Since this is a basic science project that will be carried out exclusively within the confines of research laboratories, no social impact is anticipated.

6. Potential indirect and / or long-term Impacts due to anticipated future activities in the project areas (assessment of anticipated conflict / complimentarity with the current as well as those proposed for the next five years) in the areas of activities of the sub-Project): **Nil.**
7. Identify the key stakeholders and describe mechanisms for consultation with and to them done / disclosure so far done including pre-project consultations with the stake holders, stakeholders' workshop before formulating the full proposal, discussing the full proposal with some stakeholders before submission to the PIU :

Stakeholders in this project are scientists. Mechanisms for consultation with them will be through annual workshops, frequent consultation through emails and telephone. Pre-project consultation has been already carried out through a meeting of all consortium partners, which was then followed by a stakeholders' workshop on September 3-4, 2007.

8. **Consultation / disclosures to be done in future :**

Local disclosure through mechanisms such as launch workshop, interfaces during the implementation stage of the sub-project for sharing the results and soliciting feedback, circulating project brochures and implementation progress from time to time, putting up annual reports on the web site and annual stakeholder workshops wherever feasible

(K. Subramaniam)

Consortium PI

(Amitabha Bandyopadhyay)

National Coordinator

(Mruthunjaya)

National Director

