Darwin Initiative for the Survival of Species

Annual Report

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Project Reference Number : 162/12/026

Towards sustainable management of alien invasive weeds in southern China

Project Leader and Author: Dr. Carol A. Ellison, 17th May 2005

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1. Darwin Project Information

Project Ref. Number	162/12/026
Project Title	Towards sustainable management of alien invasive weeds in southern China
Country(ies)	UK, China
UK Contractor	CABI Bioscience (CABI) (an institute of CAB International), Silwood Park, Ascot, Berks. SL5 7TA
Partner Organisation(s)	Institute of Biological Control (IBC), Chinese Academy of Agricultural Sciences (CAAS), Beijing, China Guangdong Entomological Institute (GEI), Guangzhou, China
Darwin Grant Value	£177,508
Start/End dates	October 2003 / September 2006
Reporting period and report number	1st October 2003 to 31March 2005 Report 2.
Project website	http://www.CABI-Bioscience.org
Author(s), date	Dr. Carol A. Ellison, 17th May 2005

2. Project Background

- Invasive alien species (IAS) represent the greatest threat to the preservation of global biodiversity after habitat destruction. In the fight to safeguard the world's biodiversity against IAS, it is essential not only to assess their impact, but also to develop and employ control strategies that are not damaging to the environment. The use of co-evolved natural enemies, a strategy referred to as classical biological control (CBC), has proven to be an efficacious, cost-effective, sustainable and safe option for the management of alien weeds. The aim of this method of natural weed suppression is to select agents (arthropod and pathogen) from the centre of origin of the target weed, and after intensive assessment and screening for specificity, release them in the invasive range.

  As a leading international organisation in the field of biological control, CABI Bioscience, has received a number of independent requests from local scientists in China, concerning the sustainable control of invasive alien weeds (IAW). CAB International (parent organisation of Bioscience) has a history of collaborative development projects with China, and has recently established an office in Beijing. Although China has expertise in the biological control field, CBC of IAW has yet to be fully exploited, and the use of pathogens is a totally new

technology to China.

Amongst those weed species that have been identified as having the highest environmental impact in China, is the pernicious, neotropical, composite *Mikania micrantha* (mile-a-minute weed or Mikania). This vine is a serious problem in Guangdong Province, particularly within the highly biodiverse National Conservation Areas. This project aims to implement a pilot project for the CBC of Mikania, by exploiting a similar programme already underway in India.

3. Project Purpose and Outputs

- The purpose of this project is to develop the capability of exploiting pathogens for the sustainable management of IAW in China. The project will specifically develop and apply the research already undertaken under a DFID-funded NRI-administered project for the classical biological control of Mikania in India, using the highly host specific, neotopical rust fungus *Puccinia spegazzinii*. Training activities and hands-on experience received during the project will empower Chinese scientists with the skills necessary to develop new collaborative proposals. The objective is to develop these proposals during the course of the programme, with support from CABI personnel, targeting other invasive weeds that are seriously affecting the biodiversity in native environments in China.

  Annex 1 is a report of the progress and achievements against the Logical Framework for Financial Year 2004/2005, the original project logical framework, follows this as Appendix 1.

4. Progress

- The project was initiated in October 2003. The Inception Workshop was held in November in China, and the prospective rust release site Neiling Ding Island, Guangdong Province, off the coast of Southern China, had been established by GEI. At the workshop, the project work plan was discussed, the methodology for the assessment of the weed within the permanent sample plots agreed, and the release site for the rust visited by all collaborators. Two Chinese scientists (Han Shichou and Fu Weidong) came to CABI for training in February 2004 and the isolate of the rust to be imported into China was selected. An Import Licence was obtained by BCI, for the rust to be shipped to China, for testing in quarantine.
- During this reporting year the rust was successfully shipped to China and established under quarantine conditions in Beijing. Additional host specificity testing was undertaken and the results reported to the China Import and Export Inspection Bureau (IEIB); the authority responsible for issuing the release permit. The results backed-up those reported on from the UK concerning the reaction of sunflower when challenged by the rust: chloroitic spots develop 7 days after inoculation. However, although these spots did not develop any further, the IEIB requested that more commercially grown sunflower varieties be tested before they could consider issuing a release permit. In addition, the rust was found to infect the one and only species of *Mikania* that is native to Asia (*M. cordata)*. This had not previously been tested under the India DfID funded sister programme, since it does not occur in India. This issue is discussed in the Darwin six-month report (October 2004). The attitude of the IEIB to this finding has yet to be clarified by BCI, although is appears to be less of an issue than the sunflower reaction. The testing of the sunflower varieties is estimated to be complete by the end of May.

  Slippage: The two issues discussed above (sunflower reaction and infection of *M.cordata)* have delayed the progress towards the release of the rust in Guangdong (originally planned for April 2005)

- This project is progressing well, despite the above problems. Importantly, these problems are being immediately address by the project collaborators, and reported to the UK coordinator. The achievements of the project this year can be considered under the following categories:

Planning

During a visit to China under another Initiative (CABI – Global Invasive Species Programme [GISP] – CAAS workshop), the UK project staff (Drs Ellison and Murphy) took the opportunity to hold an unscheduled Darwin Initiative project meeting (1st November 2004). Ms. Fu Weidong, Prof. Tang Wenhua and Prof. Han Shichuo attended this meeting. Discussions were held on the additional host specificity testing that had been undertaken in China and the implications to the success of the project. A tour was made of the quarantine unit glasshouse to look at the screening results. It was also decided that the Workshop in Guangdong and publicity campaign, planned for January 2005, should not be undertaken until the rust is established on Neilingding Island.

Research

A report on the additional host specificity screening is given in Appendix 2.

Assessment and Monitoring

GEI has applied to the Shenzen Authorities & Guangdong Bureau of Forestry for permission to release of the rust in Shenzen. Data on the infestation of the weed on Neilingding Island has yet to be supplied by GEI.

- The problems concerning the specificity of the rust have prevented the project activities progressing as quickly as planned, in the latter part of the project year. This has resulted in the necessity to screen additional varieties of sunflower. Fortunately, the involvement of the IEIB, from the out-start of the project has prevented unnecessary delays in decision making at this level.
- No changes have been made to the design of the project over the reporting period, only a delay in activities.

Timetable for reporting period April 2005 to March 2006

Time period	Output (output addressed in Logical Framework)	Activities	Personnel Responsible
June 2005	Release permit issued by IEIB (3)		IBC Fu Weidong/ Jianqing Ding
July 2005	Release permit issued by Shenzen Authorities & Guangdong Bureau of Forestry (3)		GEI Han Shichou/ Li Liying
June 2005 (Activity brought forward from previous year)	English translation of Island Survey (2) Report on weed infestation within sample plots (2)	Survey carried out by Guangdong Neilingding Futian National Nature Reserve Administration, on Mikania infestation over whole of Neilingding Island, Guangdong, translated into English Data on weed infestation of permanent sample plots within release site gathered/analysed.	GEI Han Shichou/ Li Liying
June 2005-August 2005 (activity brought	Large numbers of rust infected plants prepared for field release (3)		GEI Han Shichou/ Li Liying

forward from previous year)			
Aug 2005	Rust released on Neiling Ding Island, Guangdong Province (3)	Potted, living rust infected plants transported to Neiling Ding, and placed in field during the rainy season	GEI Han Shichou/ Li Liying
Nov 2005-	Public awareness campaign implemented (5)	China, Guangdong: Targeted information produced (leaflets, posters, and videos); media contacted (local and national T.V. and newspapers); popular articles produced China, Beijing: Policy makers awareness campaign UK: Press release made	GEI IBC CABI
Dec 2005-March 2006	Workshop held (1) Development of new proposals initiated (6)	Workshop held in China on the principles and practices of classical biological control Working group established for the development of new project proposals. Work plan, responsibilities and targets established.	GEI –hosting & organisation of workshop, teaching CABI & IBC – teaching IBC –lead organisation

5. Actions taken in response to previous reviews (if applicable)

- The previous reviewer (03/04) raised the issue of CBD and the necessity to obtain permission from Argentina to use the rust in China. This has been pursued by CABI for over a year now, and has only resulted in being passed from authority to authority and from person to person. It would appear that there is no procedure in place, despite being assured, by a number of sources, that there would be no problem in obtaining permission. The quest continues.

6. Partnerships

- There has been good communication over this year of the project. No serious problems have been encountered, and all collaborators regularly communicate. It has however, proven difficult to obtain the English translation of the Island Survey and the report on weed infestation within sample plots. This will be pursued.

  Good relations between the China IEIB and IBC have proved fundamental to the progress of this project.

- Mikania is an Asia-wide invasive weed problem, and CABI is established as the leader in the CBC of this weed. Consequently, though the Darwin Initiative and the sister project in India (funded by DfID) there has been much interest in taking this technology to other affected countries:
  Nepal: A stakeholder meeting was organised by CABI Bioscience and Himalayan Nature, held at IUCN Nepal country office, Kathmandu in November 2004, to discuss the Mikania problem in the Tehri region of Nepal. This meeting was a great success, and was attended by representative form both conservation and agricultural organisations, who endorsed the principal of CBC for this weed. This would have lead on to a DfID short project (8 months), to ascertain impact of *Mikania* and to develop a CBC programme, had the coup not occurred in February 2005.
  Taiwan: CABI and Taiwan National University are currently developing a

programme to introduce the rust pathogen against *Mikania* in Taiwan.
South Pacific Islands: A programme is near to being funded by ACIAR for the classical biological control of *Mikania* in Fiji (though the Secretariat of the Pacific Community), CABI Bioscience has been asked to be a partner institute. The CABI Darwin project leader will be attending the Roundtable for Nature Conservation in the Pacific and the Invasive Species Working Group (ISWG) meetings to be held in Alatau, PNG in July 2005, *Mikania* biological control will be promoted and other weed targets discussed.

7. Impact and Sustainability

- This year, due to the delays in the project activity progression, no specific promotional activities have been undertaken in China.

8. Post-Project Follow up Activities (max 300 words)

- Not applicable

9. Outputs, Outcomes and Dissemination

- The rust has been successfully shipped to China, established in quarantine and additional host specificity tested completed. A release permit was applied for, on schedule. However, due to the requests by the IEIB to undertake the testing of more sunflower varieties the project output schedule for this year has not been successfully completed. However, these can been seen a delay rather than a failure to achieve the outputs. Once the release permit has been issued, activities scheduled for last year and this year can resume (see Timetable for 2005/2006, 4 above).
- Dissemination activities are not part of the outputs for this reporting period.

Table 1. Project Outputs (According to Standard Output Measures)

Code No.	Quantity	Description
-	-	Rust Imported into quarantine in China
-	-	Licence to release rust applied for to the China IEIB
8	1day	Unscheduled project meeting Beijing, China, 1 day, both UK project staff attended. Meeting attended by 8 people. Project progress, host specificity issues and future activities discussed.
14A	1	Unscheduled project meeting Beijing.
14B	1	Workshop in Nepal where findings from Darwin project were presented. Attended by both UK project staff.

Publications (Table 2)

None to report

10. Project Expenditure

Table 3: Project expenditure during the reporting period (Defra Financial Year 01 April to 31 March)

Item	Budget (see project schedule)	Expenditure	Balance

- Due to the 'slippages' discussed above it was not been possible to undertake the release programme in 2004 as planned. Consequently, the workshop and public awareness campaign activities were also not, since a decision was made by the project collaborators not to start them until the rust is established in the field. This has meant that money claimed from DEFRA Darwin Initiative, has not been spend as planned. The Secretariat has been informed about this.

11. Monitoring, Evaluation and Lessons

- The monitoring and evaluation are built-in to the progression of the project. For each output to be achieved a previous stage has to be successfully completed:
  - The rust was imported in to China, after a permit was obtained by IBC;
  - A release permit was applied for after the screening had been completed;
  - Reports must be supplied by all collaborators on a six monthly basis, to allow the release of funds.

There are 4 main outputs from this year of the project, given in the table below.

Project Outputs	**Method of Evaluation**	**Current Status**
Unscheduled project meeting Beijing	Meeting minutes	-
Additional host specificity screening	Report produced Plants observed and images taken of non-host reactions to rust by UK collaborators.	See Appendix 2
Application to IEIB for rust release permit	Comments received from IEIB	Sunflower varieties currently being screened
Establishment of permanent sample plots	Report produced containing the data from the evaluation of the permanent sample plots. The Guangdong Neilingding Futian National Nature	Report on weed status within permanent sample plots under production. * English translation under production. *

	Reserve Administration has surveyed island to establish level of weed infestation. Data to be translated into English.	

* Reports still not received

- The importance of clear exchange of information and expectations for all collaborators is paramount to success of this project. This needs to take into account language and cultural differences, as well as support and training needs. The establishment of communication pathways (mainly e-mail) and regular (yearly) meetings are essential. The latter of these is being achieved by both meetings funded under the Darwin Initiative and by the travelling of collaborators under other project funding (eg CABI - GISP – CAAS workshop in November 2004, in Beijing attend by both UK collaborators).

  That said, despite clear communications, the GEI collaborators have still not supplied the agreed information on the *Mikania* infestation on Neilingding Island and it has not been possible to ascertain why. Unfortunately, language difficulties and cultural constraints between Chinese collaborators in different institutes based on seniority, have prevented the flow of information (ie. those collaborators with the better English are culturally prevented from inquiring into the issue with senior collaborators with limited English comprehension).

12. OPTIONAL: Outstanding achievements of your project during the reporting period (300-400 words maximum)

None to date.

Annex 1 Report of progress and achievements against Logical Framework for Financial Year: 2004/2005

Project summary	Measurable Indicators	Progress and Achievements April 2004-Mar 2005	Actions required/planned for next period
Goal*:* To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but poor in resources to achieve • The conservation of biological diversity, • The sustainable use of its components, and • The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources			
Purpose To develop the capability of exploiting pathogens for the sustainable management of invasive alien weeds in China	SHORT TERM: *Puccinia spegazzinii* (rust) established in the field in China LONG TERM: Mikania weed controlled & conservation areas protected. Conservation authorities adopt classical biological control using fungi as an alternative strategy for the management of alien invasive weeds	SHORT TERM: Host specificity screening of the rust completed in Beijing. Supplementary Dossier containing the results submitted to Chinese quarantine authority as part of application for release permit. Additional screening request from authorities underway.	Rust to be released in Guangdong Province, and spread monitored.
Outputs			
1. Chinese scientists & weed control practitioners trained in weed biocontrol with pathogens	1. Scientists visit UK & receive training; workshop held	Report finalise on Fu Weidong (IBC) and Han Shichou (GEI) visited UK (Feb 2004) for training in weed pathology.	Workshop for weed control practitioners, in biocontrol with pathogens, planned to be held in late 2005 / early 2006.
2. Permanent sample plots established & weed impact assessed in China	2. Plots established & methodology agreed with collaborators	Permanent sample plots have been set-up and are being monitored.	Provide English translation of data of weed infestation on whole of Island rust release site (underway).

			Report on level of weed infestation in sample plots to be finalised.
3. Biocontrol agent imported & released in China	3. Permit for import & release applied	Rust successfully shipped to China (July 2004). Additional host specificity testing completed under quarantine in China (Feb 2004) Release permit applied for and its issue is under discussion (March 2004)	Completed supplementary host specificity as testing requested by quarantine authorities (sunflower varieties) (May 2005?). Obtain release permit both from IEIB (June 2005?) and Guangdong Authorities (July 2005?).
4. Rust impact studies initiated	4. Methodology agreed with collaborators		Support will be provided by UK collaborators on the development of techniques for the monitoring of the pathogen in the field, and the establishment of suitable impact methodology.
5. Public awareness campaign implemented	5. Targeted information produced (leaflets, posters, videos); media contacted		The public awareness campaign will be initiated once the rust is established on Neilingding Island (October 2005?).
6. Results publicised & new project proposal developed	6. Articles/proposals developed		The development of new project proposals will be initiated at the Biological Control workshop (late 2005 / early 2006). A national press release in UK.

Note: Please do NOT expand rows to include activities since their completion and outcomes should be reported under the column on progress and achievements at output and purpose levels.

APPENDIX 1: LOGICAL FRAMEWORK

1. Please enter the details of your project onto the matrix using the note at Annex B of the Guidance Note.

Project summary	*Measurable indicators*	*Means of verification*	*Important assumptions*
Goal: To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but poor in resources to achieve • the conservation of biological diversity, • the sustainable use of its components, and • the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources			
Purpose To develop the capability of exploiting pathogens for the sustainable management of invasive alien weeds in China.	SHORT TERM: *Puccinia spegazzinii* (rust) established in the field in China LONG TERM: *Mikania* weed controlled & conservation areas protected. Conservation authorities adopt classical biological control using fungi as an alternative strategy for the management of alien invasive weeds.	*Mikania* weed no longer an ecological threat. New proposals employing pathogens as classical biological control agents developed; technical reports, scientific papers and publicity generated.	Government of China does not change current policy on introduction and release of exotic biocontrol agents. China maintains its commitment to the CBD. Assumes political situation in China does not prevent project activities.
Outputs 1. Chinese scientists & weed control practitioners trained in weed biocontrol with pathogens 2. Permanent sample plots established & weed impact assessed in China 3. Biocontrol agent imported & released in China 4. Rust impact studies initiated 5. Public awareness campaign implemented 6. Results publicised & new project proposal developed	1. Scientists visit UK & receive training; workshop held 2. Plots established & methodology agreed with collaborators 3. Permit for import & release applied 4. Methodology agreed with collaborators 5. Targeted information produced (leaflets, posters, videos); media contacted 6. Articles/proposals developed	1. Reports from trainees & in-country institutions 2, 4 & 6 Project report/ scientific papers; proposals submitted 3. Document from CAAS 5. Media broadcasts/ popular articles published	Suitable participants available for training courses Import Licence issued Biocontrol agents perform according to expectations Technology transfer allows the scientists to implement the strategy effectively Media uptake
Activities Training	**Activity Milestones (Summary of Project Implementation Timetable)** **Yr 1**: Inception workshop for all collaborators, China (10 days); two Chinese scientists to visit UK (4 weeks). **Yr2**: Workshop held in China on the principles and practices of classical biological control, run by CABI Bioscience (5 days); new project proposals developed (5 days). **Yr 4**: End of project workshop for all collaborators to discuss results & follow on activities (5 days); finalization of new project proposals (5 days).		
Implementation of biocontrol strategy	**Yr 1**: Permanent sample plots set up in nature reserve, China; weed impact assessed; rust imported into China for completion of additional host specificity screening; dossier submitted to China for release of rust. **Yr 2**: Rust released in Guangdong; establishment and spread monitored. **Yr 3**: Rust spread monitored. **Yr 4**: Impact within sample plots assessed; capacity put in place for long-term monitoring of rust impact.		
Promotion of programme	**Yr 2**: Public awareness campaign implemented in Guangdong; policy maker's awareness campaign implemented Beijing. **Yr 4:** Scientific paper prepared and published; assessment report written for Chinese government policy makers.		