Department for Environment Food & Rural Affairs

DARWIN INITIATIVE

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Darwin Initiative/Darwin Plus Projects
Half Year Report
(due 31st October 2020)

Project reference	25-032
Project title	Biodiversity and agriculture: addressing scale insect threats in Kenya
Country(ies)/territory(ies)	Kenya
Lead organisation	Natural History Museum
Partner(s)	National Museums of Kenya; University of Nairobi; Kenya Agricultural and Livestock Research Organisation; Kenya Forestry Research Institute; Kenya Plant Health Inspectorate Service; CAB International
Project leader	Dr Andrew Polaszek
Report date and number (e.g. HYR3)	HYR3
Project website/blog/social media	https://www.cabi.org/projects/addressing-scale-insect-threats-in-kenya/

1. Outline progress over the last 6 months (April – Sept) against the agreed project implementation timetable (if your project has started less than 6 months ago, please report on the period since start up to end September).

This report covers the period 1 April to 30 September 2020.

Output 1: *Increased informed perception by smallholder farmers/foresters and extension providers of the scale insect threats to agricultural production, and on the means to manage the pests without disturbing agro-ecosystems, leading to increased crop yield for affected farms.*

Field training materials were produced jointly by CABI, NHM. NMK, KEPHIS and KEFRI.

Output 2: *A publicly-available scale insect and natural enemies inventory for Kenya developed, with distribution maps for species recorded from the study area in three coastal counties of Kenya.*

Activity 2.1 One student and 4 technicians from UoN and KEPHIS trained in field recognition, collection, preservation, slide-mounting, digital photography and identification. Michael Mathenge Githae, the UoN M.Sc. student, expects to submit his thesis on *Assessment of diversity and seasonal dynamics of scale insects and associated biota on citrus trees in Coastal and Lower Eastern Counties, Kenya* by mid-November 2020. He has also submitted a manuscript on *Ants (Hymenoptera: Formicidae) associated with scale insects (Hemiptera: Coccomorpha) on citrus trees in Coastal and Lower Eastern Counties, Kenya* for publication in *Journal of Entomology, Science Alert*.

Activity 2.2 At least 30 scale insect species recorded in target areas, with associated natural enemies. Most of the 79 samples of scale insects and their natural enemies collected in 3 coastal counties in February 2020 have not been identified yet, due to the pandemic. So far 4 samples have been processed, in which 1 more new country record was found, bringing the total to 29 species recorded from the coastal counties.

Activity 2.5 At least 30 distribution maps produced. Collection data for the 80 samples processed at the NHM so far (26 of them collected from the 3 coastal counties) have been sent to NMK for development into distribution maps. The data are incomplete at this stage but some draft maps have been produced to test the software.

Activity 2.6 Kenyan pest list reviewed to include scale insect species not recorded previously. Two manuscripts have been prepared in collaboration with KEPHIS and other Kenyan partners, documenting 55 new country records (including 2 new continental records) identified so far. One manuscript (documenting 43 species) has been submitted for publication in the *African Phytosanitary Journal*; the other is still in preparation.

Output 3: *Taxonomic researchers, parataxonomists and extension officers trained, and pest management decision chain implemented through identification capacity building among all stakeholders.*

Activity 3.2 NMK national collection of scale insects enhanced, and 4 institutional reference collections established at UoN, KALRO, KEFRI and KEPHIS. Preparation of 5 slide mounts of each species in each sample, to build the insect collections, is very time consuming. The remaining 75 samples collected in February 2020 need to be slide mounted and identified before Kenyan checklists and distribution maps can be fully compiled. Arrangements are being made for this specialist work to be carried out at home. All participants have been involved in the collection of samples.

Activity 3.3 One identification key to scale families, 12 keys to genera and 90 keys to species developed and published for taxonomists by the end of year 2. Seven manuscripts in the series, *Towards identification of the scale insects (Hemiptera: Coccomorpha) of continental Africa* are at various stages of completion. The identification key to 23 families known from continental Africa, with a summary of identification aids in the existing literature, will be submitted to *Zootaxa* in November. Three more manuscripts providing continent-wide coverage of 18 small scale insect families (including 10 keys to genera and 40 keys to species) are well advanced; each family coverage will provide an African checklist and identification keys to genera and species. A checklist of the scale insects of Kenya is also being compiled for publication.

Activity 3.4 One photo guide for smallholder farmers, 1 photo guide for smallholder foresters, 1 photo guide for parataxonomists, 1 photo guide and at least 30 fact sheets for extension officers developed by end of year 2. It has been most practical to address the photo guide needs of smallholder farmers, foresters, parataxonomists and extension officers in a single *Photo Guide*, which have been prepared by CABI with support from the NHM and KEPHIS. The *Photo Guide* provides colour photographs and bullet-point information on pest field appearance, host range and crops attacked, for each of 31 pest scale insects and mealybugs. This was completed at the end of July 2020 and was shared with extension workers and partner institutions, both as e-copies and hard copies.

The *Factsheets for Farmers* (covering 30 pest scale insects and mealybugs) have been prepared by CABI, with support from the NHM and KEPHIS. These provide accessible pest identification support and sustainable control advice to both County Extension Officers and farmers. Each *Factsheet* is illustrated with colour photographs of live insects, and includes a list of sustainable control practices that can be used against the pest. The *Factsheets* were completed at the end of July 2020 and were shared with extension workers and partner institutions, both as e-copies and hard copies.

Output 4: *Best practices for improving management of scale insect pests developed, disseminated to raise key stakeholder awareness and capacity, and adopted by them.*

Activity 4.1 Best practices intended to guide sustainable scale insects pest management practice developed by mid-year 2. The *Factsheets for Farmers* provide accessible pest identification support and sustainable control advice to both County Extension Officers and farmers. They were completed at the end of July 2020. KEPHIS reports that the draft best practices guide for sustainable insect pest management is now ready for discussion.

Activity 4.3 Five media articles and radio programmes every year of the project, for general public information. Papaya mealybug is the most significant scale insect pest on farms in the coastal counties. Radio scripts in Kiswahili on papaya mealybug recognition and management have been prepared by CABI and the partner institutions, consisting of a combination of live shows and feature spots. The radio campaign was launched on 4th October 2020 and will air every Thursday for 7 weeks on Radio Kaya, a Kwale County-based regional Kiswahili radio station. The project partners and project county extension officers are the resource persons. The radio station will provide us with the recordings and coverage at the end of each session, which will be available to the partner institutions.

The radio broadcasts on papaya mealybug include discussion of sustainable control practices against this most serious mealybug pest; such practices are appropriate for use against all mealybug pest species. The broadcasts will reach a much wider audience than the hard copy products, and the recordings will make this information available whenever needed in future.

Publicity about DI project radio campaign

A news article about the radio campaign has been posted on CABI.org, and social media on the CABI news and invasives accounts; it is also available on Yammer:
https://www.cabi.org/news-article/taking-to-the-airwaves-to-help-kenyas-smallholder-farmers-fight-back-against-devastating-papaya-mealybug/

This news was subsequently featured in the Standard (a local newspaper in Kenya):
https://www.standardmedia.co.ke/farmkenya/crop/article/2001389707/taking-to-the-airwaves-to-help-smallholder-farmers-fight-against-papaya-mealybug

2a. Give details of any notable problems or unexpected developments/lessons learnt that the project has encountered over the last 6 months (for Covid-19 specific delays/problems, please use 2b). Explain what impact these could have on the project and whether the changes will affect the budget and timetable of project activities.

None.

2b. Please outline any specific issues which your project has encountered as a result of Covid-19. Where you have adapted your project activities in response to the pandemic, please briefly outline how you have done so here. Explain what residual impact there may be on your project and whether the changes will affect the budget and timetable of project activities.

The pandemic lockdown and ongoing Covid-19-related precautions involving working at home rather than in institution offices and laboratories have delayed laboratory processing and identification of the 79 scale and natural enemy samples collected in February 2020. This in turn is delaying the development of distribution maps of pests and natural enemies by NMK. Reduced access to library facilities has also slowed progress in the preparation of manuscripts on the scale insect and mealybug families and their identification. Uncertainty over future pandemic developments also makes it difficult to plan administration and analysis of the final socio-economic survey within the project time constraints.

The communication activities were equally hampered by the Covid-related travel restrictions. We used telephone surveys to be able to reach farmers about their communication preferences instead of the face-to-face rural communication appraisal. However, we obtained adequate information that helped to design the radio campaign activity.

NMK reports that the pandemic resulted in cessation of group slide and identification practice sessions for partners at NMK, and reduced field sessions for the collection of natural enemies. Closure of offices in Kenya has resulted in reduced access to administration facilities and thus delay in some activities.

KEPHIS reports that awareness and stakeholder consultations are currently limited due to Covid restrictions on meetings to discuss policy briefs and the best practice document. They can only have a few participants per meeting, leading to having many meetings in order to involve an adequate number of stakeholders.

KEFRI reports that the pandemic has made meetings impossible even where there is a pressing need for partners to meet and discuss key issues/outputs. These meetings now have to be done through Zoom, and this is adversely affected due to the poor infrastructure network in Kenya. Meetings that would take place to discuss the draft socio-economic scientific paper also have been affected. However, it is expected that by the time of the next report the manuscript will have been completed for publication.

KALRO reports that preparations for a second socio-economic survey on scale insects at the Coastal region have been finalised. The Ministry of Agriculture at the coastal regions (Mombasa, Kilifi and Kwale) are ready for the exercise. Unfortunately, Covid and government restrictions prevented the survey from being undertaken in May 2020. KALRO are planning to start the activity as soon as participants' safety has been fully assessed. The manuscript from the previous survey is undergoing final reviews before submission to publishers.

2c. Have any of these issues been discussed with LTS International and if so, have changes been made to the original agreement?

Discussed with LTS:	Yes

Formal change request submitted:	No (to be submitted)
Received confirmation of change acceptance	Yes/No

3a. Do you currently expect to have any significant (e.g. more than £5,000) underspend in your budget for this year?

Yes ☐ **No** ☒ Estimated underspend: £

3b. If yes, then you need to consider your project budget needs carefully. Please remember that any funds agreed for this financial year are only available to the project in this financial year.

If you anticipate a significant underspend because of justifiable changes within the project, please submit a rebudget Change Request as soon as possible. There is no guarantee that Defra will agree a rebudget so please ensure you have enough time to make appropriate changes if necessary. Please DO NOT send these in the same email as your report.

4. Are there any other issues you wish to raise relating to the project or to Darwin's management, monitoring, or financial procedures?

The 6-month extension request was retracted by the NHM's head of science resources. Discussions are ongoing to resolve this situation. It is very likely that the extension request will be resubmitted well before the end of Q3 (end December 2020).

If you were asked to provide a response to this year's annual report review with your next half year report, please attach your response to this document.

Please note: Any planned modifications to your project schedule/workplan can be discussed in this report but should also be raised with LTS International through a Change Request. Please DO NOT send these in the same email.

Please send your **completed report by email** to Darwin-Projects@ltsi.co.uk. The report should be between 2-3 pages maximum. **Please state your project reference number in the header of your email message e.g. Subject: 25-001 Darwin Half Year Report**