Republic of the Philippines
DEPARTMENT OF AGRICULTURE
Biotechnology Program Office
2nd Floor, East Wing, DA-OSEC (Old) Building, Elliptical Road, Diliman, Quezon City
Telefax: (02) 927-0426/922-0057 Email: biotechpiu@gmail.com
Website: www.dabiotech.com

TERMINAL REPORT
ESMES Form 8
(Rev. Mar. 2017)

A. BASIC INFORMATION	
Project Title	**ENHANCING PHILFIDA'S CAPABILITIES ON VIRUS DETECTION AND ABACA MICROPROPAGATION FOR MORE EFFECTIVE AND EFFICIENT DELIVERY SERVICES**
Project Short Title	**Abaca Virus Detection**
Project Type	ICE
Priority Area	Abaca
Proponent/Proposing Institution Head of Agency Designation Address Tel./Fax No. Mobile No. Email	 **KENNEDY T. COSTALES** Executive Director Philippine Fiber Industry Development Authority 3F PCAF Building, DA Cmpd, Diliman, QC Trunk Line Numbers: (+632) 2732474 / (+632) 9288756 to 65 local 2650 Direct Line Number: (+632) 4414606 philfidaoed@gmail.com
Lead Implementing Agency Head of Agency Designation Address Tel./Fax No. Mobile No. Email	**KENNEDY T. COSTALES** Executive Director Philippine Fiber Industry Development Authority 3F PCAF Building, DA Cmpd, Diliman, QC Trunk Line Numbers: (+632) 2732474 / (+632) 9288756 to 65 local 2650 Direct Line Number: (+632) 4414606 philfidaoed@gmail.com
Project Leader Name Designation Institution Address Tel./Fax No. Mobile No. Email	 **LENY C. GALVEZ** Science Research Specialist II 3F PCAF Building, DA Cmpd, Diliman, QC Direct Line Number: (+632) 721-9819 0908-1853218 lcgalvez@yahoo.com
Project Co-leader Name Designation Institution Address Tel./Fax No. Mobile No. Email	 **JOSE L. CATALLA** Chief, Research Division 3F PCAF Building, DA Cmpd, Diliman, QC Direct Line Number: (+632) 721-9819 0908-1853218 jlcatalla@yahoo.com

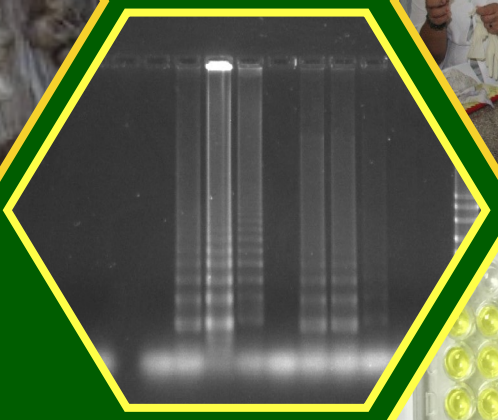
Project Staff Name Designation Institution Address Tel./Fax No. Mobile No. Email	**ROBERT G. ATIENZA** Supervising Agriculturist 3F PCAF Building, DA Cmpd, Diliman, QC Direct Line Number: (+632) 721-9819 0908-1853218 rgatienza2000@yahoo.com			
Undergraduate and Graduate Students Involved in the Project Name Course and Specialization				
Collaborating Agency/ies/Private Sector Head of Agency Designation Address Tel./Fax No. Mobile No. Email Signature				
Project Location Region Province Municipality	 National Capital Region Metro Manila Quezon City			
Project Duration Start-up Date Completion Date Total No. of Years	 February 24, 2016 February 24, 2017 with 2-year extension			
Total Budget Requirement Budget Requested Agency Counterpart Other Sources	 PhP 5,820,000.00 PhP 1,510,083.00 None			
Other Funding Sources Institution/Program Amount				
Project Funding:	Total Approved Budget **PhP 5,820,000**	Actual Budget Released **PhP 5,820,000**	Actual Expenses **PhP5,604,635.68**	Balance to Date **PhP215,364.32**

ENHANCING PHILFIDA'S CAPABILITIES ON VIRUS DETECTION AND ABACA MICROPROPAGATION FOR MORE EFFECTIVE AND EFFICIENT DELIVERY OF SERVICES

Leny C. Galvez
Project Leader








Implementing Agency
Philippine Fiber Industry Development Authority

Funding Agency
DA-BAR/Biotech Program Office

DA-BIOTECH C1506

DA-Philippine Fiber Industry Development Authority

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D. ATTACHMENTS
DOCUMENTS SUBMITTED AS HARD COPIES

Immunology and Molecular Biology Laboratory Safety Manual	10 copies
Protocol for Abaca Virus Detection	10 copies
Harmonized Tissue Culture Protocol for PhilFIDA Laboratories	10 copies
Abaca Germplasm Conservation	10 copies

D. LIST OF TABLES

ABSTRACT

This Project aimed at enhancing the capability of PhilFIDA towards achieving greater efficiency and effectiveness in the delivery of services in terms of virus detection and distribution of virus-free abaca plantlets. A total of 41 units of laboratory equipment were procured for five (5) Tissue Culture Laboratories (TCL), three (3) Diagnostic Laboratories (DL) and one Immunology and Molecular Biology Laboratory (IMBL). Three (3) units of protected nurseries/screenhouses of TCLs were rehabilitated. PhilFIDA research personnel were trained on virus detection, tissue culture techniques, germplasm characterization, technical writing and statistical methods. The series of trainings had equipped the laboratory and research personnel with a deeper technical knowledge, competence and stronger confidence in the science of their work.

INTRODUCTION

In the light of the growing interest around the world for biodegradable products and forest conservation, abaca with its natural and superior material offers a lot of potential for industrial utilization. It is now a preferred material in the production of pulp for specialty papers like tea bags, meat/sausage casings, cigarette paper, filter papers, currency notes, stencil papers and other non-woven product applications. Both local and international companies are continuously designing highly specialized products using abaca as alternative fiber. Glatfelter, the largest producer of abaca pulp in the world, makes tea bags from high quality abaca fiber together with other man-made fiber to achieve rapid release of first-class tea aroma. It is also producing heat-sealable coffee filter paper with abaca fiber as filtration layer. These developments in international market requires stable supply of high quality fiber. The abaca production is however, hampered by the occurrence of dreaded viral diseases namely bunchy-top, bract mosaic and mosaic which cause significant reduction in fiber quality and yield.

To address the issues on abaca diseases, PhilFIDA collaboratively works with LGUs and abaca farmers to control and contain virus diseases through continuous surveillance and eradication. Severely infected plantations or "hotspots" are sprayed with insecticide to kill the aphid vectors, while the infected abaca plants are rouged or treated with glyphosate to eradicate sources of virus inocula.

PhilFIDA also encourages farmers to use high-yielding and disease-free abaca planting materials in replanting their treated abaca farms and in rehabilitating old and typhoon-damaged farms. In line with this, the Agency operates five (5) tissue culture laboratories located in Albay, Sorsogon, Catanduanes, Leyte and Davao City mainly to produce virus-free abaca planting materials and make them available to farmers. Three (3) diagnostic laboratories situated in Legazpi City, Abuyog, Leyte and Davao City are also being operated to provide support to the TCLs and ensure that the abaca plantlets are virus-free by conducting serological test through the Enzyme-linked Immunosorbent Assay (ELISA) before mass propagation. In addition, PhilFIDA is operating an immunology laboratory in Quezon City that produces and supplies antisera to the regional diagnostic laboratories. All these nine (9) laboratories shall be strengthened, in terms of equipment and manpower to maximize their operation and better serve the Agency's beneficiaries and clientele as regard to provision of virus detection services and distribution of virus-free abaca planting materials. Hence, this project.

OBJECTIVES

GENERAL:

To enhance the capability of PhilFIDA to effectively and efficiently undertake virus detection and *in vitro* micropropagation of virus-free abaca tissue cultured plantlets.

SPECIFIC:

1. To procure several pieces of laboratory equipment for the PhilFIDA Immunology, Diagnostic and Tissue Culture Laboratories

2. To enhance the technical skills and competence of the laboratory staff of the Immunology, Diagnostic and Tissue Culture Laboratories

MATERIALS AND METHODS

COMPONENT I.

Upgrading of Immunology, Diagnostic and Tissue Culture Laboratories

Upgrading of these nine (9) laboratories will include replacement of old equipment and purchase of additional new units.

In addition, three (3) protected nurseries of TCLs in Legazpi City, Virac, Catanduanes, and Davao City shall be rehabilitated.

COMPONENT II.

Technical skills enhancement on abaca germplasm characterization, virus detection, tissue culture techniques and technical report writing

The following trainings were conducted with the aim of enhancing the capabilities of the PhilFIDA's laboratories and research personnel.

1. Abaca Germplasm Characterization
2. Disease Indexing of Abaca Viruses (protein-based and nucleic acid-based detection)
3. In vitro Micropropagation of Abaca Using Shoot Tip and Inflorescence
4. Technical Writing/Project Development and Research Design

PROJECT RESULTS, OUTPUT AND DISCUSSIONS

COMPONENT I

Upgrading of Immunology, Diagnostic and Tissue Culture Laboratories

PhilFIDA is operating five (5) Tissue Culture Laboratories (TCLs) located in Abuyog, Leyte, Davao City, Legazi City, Sorsogon City and Virac, Catanduanes. These laboratories are mandated to undertake massive production of high-yielding and disease-free abaca plantlets through the shoot-tip culture technique. In support to our TCLs, three (3) Diagnostic Laboratories are located in each region which are tasked to perform disease indexing of explants for micropropagation. Only suckers that test negative to viruses are used as explants. One (1) Immunology Molecular Biology Laboratory (IMBL) is located at the Central Office that produces antisera against abaca bunchy-top virus, banana bunchy-top virus, banana bract mosaic virus and mosaic virus in abaca. These antisera are being supplied to the regional diagnostic laboratories for their virus detection activity. Similarly, IMBL is responsible for the R&D activities related to abaca diseases, mechanism of virus infection and detection techniques.

Immunology and Molecular Biology Laboratory

Davao Diagnostic Lab

Leyte Tissue Culture Lab

These nine (9) laboratories were upgraded by replacing the old pieces of equipment and purchasing additional new units. A total of forty-one (41) pieces of equipment were procured amounting to PhP4,004,346.25 (Table 1 and ESMES Form 5c). Moreover, three protected nurseries were upgraded/renovated/repaired. These protected nurseries are located adjacent to the tissue culture laboratories of Virac, Catanduanes; Casiguran, Sorsogon and Bago-Oshiro, Davao City (Figure 1a, 1b and 1c). These nurseries house the healthy abaca explants being used as explants as well as those that are ready for distribution.

EQUIPMENT NEEDED FOR MOLECULAR DETECTION OF VIRUSES

Thermal Cycler

PCR machine: equipment that is used for amplification of gene of interest

Gel Imaging System

Laboratory apparatus/system used for detecting, imaging, and quantitating multiplex fluorescence, chemiluminescence, stain-free and colorimetric blots and gels.

Electrophoresis System

Laboratory equipment that applies an electric charge to molecules causing them to migrate towards their oppositely charged electrode. This is usually utilized for DNA and protein applications, and is classified into gel and capillary techniques.

Pipette/Pipettors

Laboratory instrument use to transport a measured volume of liquid, often as a media dispenser.

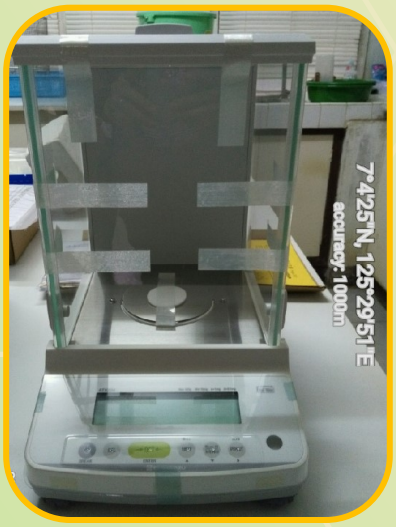
OTHER EQUIPMENT PROCURED UNDER THE PROJECT

Centrifuge

Equipment use to separate components of liquid through centrifugal force

PAGE Apparatus

Laboratory equipment that uses electric charges to separate molecular components by size through poly-acrylamide gel. It has high reslolving power which suited in analyzing small fragments like single strand-ed DNAs.



Analytical Balance

Laboratory equipment that measures mass with a high precision. It is suited in sub-milligram range.

Digital Weighing Scale

Laboratory equipment use for measuring mass of wide variety of samples with minimum of 0.1 gram

pH Meter

Laboratory equipment that measures alkalinity or acidity of a solution It is essential in preparing pH-specific reagents

Split-type Airconditioning Unit

Airconditioning system is important in regulating heat and humidity in laboratory .

Refrigerators

Laboratory equipment necessary for storing and preserving samples and reagents at low temperatures.

Laboratory Oven

Laboratory equipment used for drying, evaporation, sterilization, temperature testing, and for incubating temperature sensitive experiments.

Freezer

Laboratory equipment used for storing and preserving samples and reagents at extremely low temperature for long-term use.

Multichannel Pipettors

Laboratory equipment used to transfer measured volume of media efficiently in multiple wells or small containers at once

REHABILITATION OF SCREEN HOUSE

Figure 1a. Protected nursery at San Juan, Casiguran, Sorsogon

Figure 1b. Protected nursery at Virac, Catanduanes

Figure 1c. Protected nursery at Bago-Oshiro, Davao City

Impact of Upgrading the Laboratory Equipment and Facility on the Delivery of Services of PhilFIDA Laboratories

Prior to project implementation, PhilFIDA laboratories have been using equipment that were procured many years back. Some of these are already obsolete while others are beyond economic repair. Through wear and tear, the performance of some equipment had suffered and their accuracy were doubtful. The implementation of the project had greatly helped PhilFIDA to upgrade and modernize its laboratory facilities.

The procurement of new pieces of equipment at the Tissue Culture Laboratories such as Analytical Balance, Digital Weighing Scales and pH meter, has allowed for quicker and accurate weighing of chemicals. The Sorsogon TCL used to weigh their chemicals at the Albay TCL in Legazpi City because their old analytical balance was giving inaccurate readings, which has adverse effects on the growth of the cultures.

With the increase in virus incidence, sources of virus-free explants have become a challenge for the tissue culture laboratories. A protected nursery would ensure availability of virus-free plants as sources of explants.

Purchase of new pieces of equipment for the Diagnostic Laboratories has allowed a faster detection method using PCR. As a solution to the lack of bunchy-top virus (BTV) antiserum to detect BT, a PCR specific to ABTV and BBTV would allow for a stricter screening of explants. All samples are being subjected for ELISA against BBrMV and SCMV-Ab. Samples that are tested to be negative to BBrMV and SCMV-Ab would then be subjected to PCR specific to ABTV and BBTV. It is only after these tests that the plants could be used as explants for tissue culture.

COMPONENT II

Technical Skills Enhancement on Abaca Germplasm Characterization, Virus Detection, Tissue Culture Techniques and Technical Report Writing

Aimed at enhancing the technical skills and competencies of the laboratory personnel, four (4) trainings were conducted (Table 2). As a result of rationalization, these trainings were designed as knowledge and skills development for newly hired PhilFIDA research staff and as refresher course for existing laboratory staff/personnel who have been working in the laboratories for a long time. They, however, never had a formal training on tissue culture and virus detection and their knowledge is just handed over by the senior staff of the laboratories.

1. Training on Virus Detection Techniques in Abaca

This training was conducted on May 16-18, 2016 at Albay Diagnostic Laboratory, Legazpi City and attended by 14 laboratory and research personnel who are directly involved in disease detection activities. The topics were focused on the techniques of virus detection such as (1) protein-based virus detection and (2) nucleic acid-based virus detection which were discussed by Leny C. Galvez and Fides Angeli Zaulda of UP Diliman-National Institute of Molecular Biology and Biotechnology (UPD-NIMBB). Lectures on protein-based virus detection dealt with the production of antiserum and Enzyme-linked Immunosorbent Assay (ELISA). The participants had the chance to share their experiences in doing ELISA. Problems and troubleshooting were also discussed.

For the hands-on exercise, the participants collected abaca leaf samples in the field and subjected them to ELISA and PCR assays at the laboratory. At the end of the training, protocol for ELISA was harmonized for all PhilFIDA diagnostic laboratories. Lectures on nucleic acid-based detection focused on the use of polymerase chain

reaction (PCR). An orientation on the use and field applicability of Loop-mediated Isothermal Amplification (LAMP) was also given.

It was agreed that while the Immunology and Molecular Biology Laboratory has yet to produce good quality antisera for ABTV and BBTV, PCR technique will be used to detect ABTV/BBTV. Only plant samples that tested to be negative for SCMV-Ab and BBrMV using ELISA will be further screened for ABTV/BBTV infection via PCR.

A post test was administered on the last day of training and the result showed an average of 2.6 learning improvement for the group.

Training on Virus Detection Techniques in Abaca
Albay Diagnostic Laboratory, Legazpi City
May 16-18, 2016

Name of Trainee	Male	Female
1. Evangeline C. Cabigan		✓
2. Irma M. Navarro		✓
3. Chalene N. Nieva		✓
4. Emma O. Oloteo		✓
5. Rosedina P. Corsino		✓
6. Amor E. Anadia		✓
7. Emelita B. Mora		✓
8. Analyn D. Bolivar		✓
9. Marnelli F. Racsa		✓
10. Jose L. Catalla	✓	
11. Leny C. Galvez		✓
12. Gilda G. Alforja		✓
13. Rocky G. Raymundo	✓	
14. Mario M. Necio	✓	
TOTAL	**3**	**11**

PHOTODOCUMENTATION

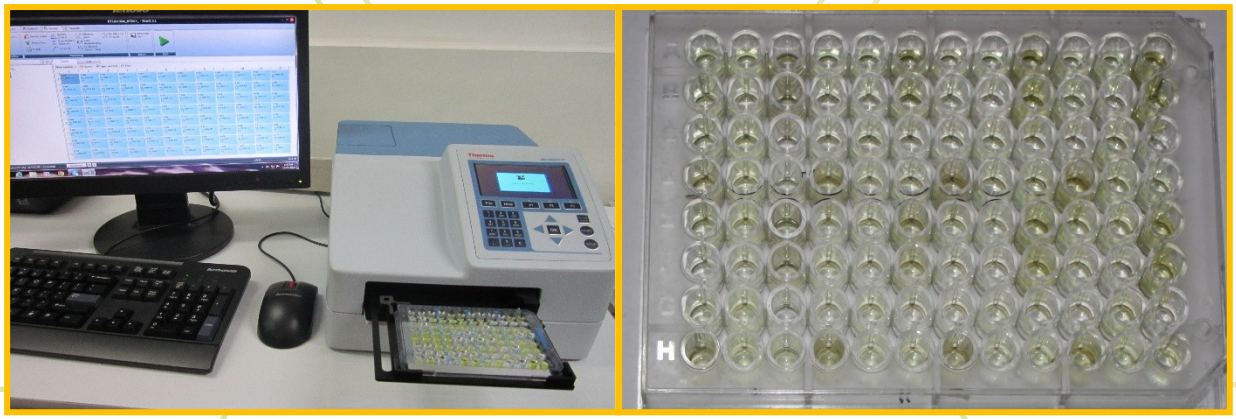
TRAINING ON ABACA VIRUS DETECTION

On-site lecture on how to use Global Positioning System (GPS) to tag sampled abaca plants

Processing of samples for ELISA

Loading of samples in ELISA plate

Washing of plate and loading of antibodies



Analysis of assay: Reading of absorbance values at 405 nm using ELISA plate reader connected to a computer

Training on Performing Polymerase Chain Reaction (PCR) Assay

DNA Extraction from abaca leaf

PCR amplification

Loading of PCR products for agarose gel electrophoresis

Viewing of electrophoresed PCR products on gel via UV transillumination

2. Training on Abaca Tissue Culture Techniques

This training was held at the Conference Room of PhilFIDA Regional Office V in Legazpi City on May 19-21, 2016 and was attended by 17 participants. Dr. Evalour T. Aspuria of the University of the Philippines Los Baños gave a lecture and demonstration on shoot tip culture. The topics that were discussed include: (1) aseptic techniques, laboratory safety and media preparation/computation, (2) shoot-tip culture, and (3) suspension cultures. The participants had a hands-on exercise on explants preparation, culture transferring and mass/root culturing at the Albay TCL. A lecture and hands-on demonstration on the production of abaca plants using inflorescence was also given.

The participants shared their experiences and troubleshooting techniques on tissue culture. A tissue culture protocol was harmonized for all the TC laboratories.

Training on Abaca Tissue Culture Techniques
Albay Tissue Culture Laboratory, Legazpi City
May 19-21, 2016

Name of Trainee	Male	Female
1. Evangeline C. Cabigan		✓
2. Irma M. Navarro		✓
3. Teresita P. Serbo		✓
4. Lorgen Z. Garcia		✓
5. Josephine R. Escalante		✓
6. Emma O. Oloteo		✓
7. Rosedina P. Corsino		✓
8. Amor E. Anadia		✓
9. Emelita B. Mora		✓
10. Analyn D. Bolivar		✓
11. Maria Gina Q. Torbila		✓
12. Marnelli F. Racsa		✓
13. Jose L. Catalla	✓	
14. Leny C. Galvez		✓
15. Gilda G. Alforja		✓
16. Rocky G. Raymundo	✓	
17.Mario M. Necio	✓	
TOTAL	**3**	**14**

PHOTODOCUMENTATION

Training on Abaca Tissue Culture

Preparation of explants

Sterilization of explants

Trimming down of leaf sheaths and shoot tip inoculation

3. Training on Abaca Characterization, Genebanking and Documentation

The training was held at the Sorsogon TCL for the lecture and at the Sorsogon Fiber Seedbank and Experimental Station at San Juan, Casiguran, Sorsogon for the field demonstration on May 23-27, 2016. Dr. Olivia Damasco gave lecture and hands on exercises on *in vitro* conservation and cryopreservation of germplasm collection. Prof. Nestor C. Altoveros and Prof. Teresita H. Borromeo discussed topics on (1) Characterization and Preliminary Evaluation using the Abaca Descriptors; (2) Field Genebank Establishment and Maintenance; (3) Documentation including passport and record keeping, database establishment and management and data analysis; and (4) Policy and laws on access to abaca genetic resources. The participants had practical exercises on the actual morphological characterization of abaca. As a training output, a protocol for establishment and maintenance of germplasm collection was standardized. Also, illustrative abaca descriptors will be prepared to guide varietal characterization.

Training on Abaca Characterization, Genebanking and PGR Documentation
Sorsogon Fiber Experiment Station and Seedbank,
San Juan, Casiguran Sorsogon
May 23-27, 2016

Name of Trainee	Male	Female
1. Edison C. Riñen	✓	
2. Mildred E. Barroga		✓
3. Maria Magdalena C. Damo		✓
4. Dante G. Lantican	✓	
5. Emma O. Oloteo		✓
6. Abmer O. Patricio	✓	
7. Josephine E. Escalante		✓
8. Tarcesio Jr. J. Nervar	✓	
9. Rosedina P. Corsino		✓
10. Amor E. Anadia		✓
11. Ferdinand C. Lazo	✓	
12. Aladin P. Repaso	✓	
13. Analyn D. Bolivar		✓
14. Crisanto E. Medel	✓	
15. Rogelio B. Chakiton	✓	
16. Marnelli F. Racsa		✓
17. Robert G. Atienza	✓	
18. Leny C. Galvez		✓
19. Jose L. Catalla	✓	
20. Gilda G. Alforja		✓
21. Rocky G. Raymundo	✓	
22. Mario M. Necio	✓	
TOTAL	**12**	**10**

PHOTODOCUMENTATION

Training on Abaca Characterization, Genebanking and PGR Documentation

Lecture and exercises on *in vitro* germplasm conservation

Abaca characterization

4. Training on Technical Writing, Research Methods and Statistics and Project Management

The training was held at the PhilFIDA Regional Office I – Batac on July 25 - 31, 2016 and participated in by 39 participants. The lecture on technical report writing was given by Dr. Frederick F. Rodrigo of MMSU with emphasis on the following topics: (1) The nature and rationale behind technical writing (2) Planning/collecting information for technical reports (3) Organizing information (4) Writing/Editing/Evaluating the technical reports. The second day of the training was devoted to technical writing workshop including proposal and manuscript preparation. The participants were asked to prepare proposals based on the identified needs.

A lecture, discussion and workshop on proposal preparation and packaging for DA -BAR and DA-BPO submission was also given by Ms. Marcellas Antonia Ynalvez of DA-Biotech Program Office. She gave emphasis on the importance of completely filling-up of the different forms (ESMES forms) required by the Steering Committee (SC) of the DA-BPO. A hands-on exercise on Logical Framework was also undertaken.

Training on Technical Writing, Research Methods & Statistics and Project Management
Mariano Marcos State University (MMSU), Batac Ilocos Norte
July 25-31, 2016

Name of Trainee	Male	Female
1. Edison C. Riñen	✓	
2. Evangeline C. Cabigan		✓
3. Florendo G. Calamaan	✓	
4. Nenita D. Cacayorin		✓
5. Mildred E. Barroga		✓
6. Myrna Q. Pascual		✓
7. Gloria A. Rosario		✓
8. Fe G. Donato		✓
9. Tatchin B. Calasiao	✓	
10. Seigfred P. Tulabis	✓	
11. Maria Magdalena C. Damo		✓
12. Dante G. Lantican	✓	
13. Emma O. Oloteo		✓
14. Abmer O. Patricio	✓	
15. Irma M. Navarro		✓
16. Lorgen Z. Garcia		✓
17. Josephine R. Escalante		✓
18. Chalene N. Nieva		✓
19. Julie G. Basco		✓
20. Gina L. Elizondo		✓
21. Tarcesio Jr. J. Nervar	✓	
22. Samuel Jr. M. Nacino	✓	
23. Rosedina P. Corsino		✓
24. Isabelita G. Paa		✓
25. Amor E. Anadia		✓
26. Ferdinand C. Lazo	✓	
27. Aladin P. Repaso	✓	
28. Analyn D. Bolivar		✓
29. Rogelio B. Chakiton	✓	
30. Emelita B. Mora		✓
31. Maria Gina Q. Torbila		✓
32. Marnelli F. Racsa		✓
33. Jose L. Catalla	✓	
34. Robert G. Atienza	✓	
35. Marieta A. Rodriguez		✓
36. Isagani R. Paraoan	✓	
37. Leny C. Galvez		✓
38. Zabdiel L. Zacarias	✓	
39. Claire A. Dacanay		✓
40. Gilda G. Alforja		✓
41. Rocky G. Raymundo	✓	
TOTAL	**16**	**25**

PHOTODOCUMENTATION

Training on Technical Writing and Statistics Abaca Tissue Culture

Discussion on proposal packaging

Hands-on exercise on data analysis and statistics

Impact of Trainings on the Delivery of Services of PhilFIDA Laboratories

The series of trainings conducted for the PhilFIDA laboratory personnel enhanced and strengthened their knowledge and skills in tissue culture, virus detection and germplasm collection maintenance and characterization. Moreover, their efficiency in the delivery of PhilFIDA services has been reinforced as they gain competence and confidence in their work. They were also able to package project proposals according to the requirement of the DA-BAR/BPO.

CONCLUSION

The project immensely contributed in enhancing the capability of PhilFIDA research personnel in the delivery of services for virus detection and distribution of virus-free abaca plantlets. A total of 35 pieces of laboratory equipment were procured for the Tissue Culture Laboratories (TCLs), Diagnostic Laboratories (DLs) and Immunology and Molecular Biology Laboratory (IMBL). Three (3) units of protected nurseries/screenhouses of 3 TCLs were built/rehabilitated in Virac, Catanduanes; Casiguran, Sorsogon; and Bago-Oshiro, Davao City.

Moreover, PhilFIDA research personnel were trained on virus detection, tissue culture technique, germplasm characterization and technical writing and statistical methods. The series of trainings gave them stronger technical knowledge and stronger confidence in the science of their work.

RECOMMENDATION

The following are being recommended to further strengthen the capability of PhilFIDA research and laboratory staffs:

1. Conduct a yearly refresher course to review and to get updated with the new technologies. Intensive training program for new researchers to provide them necessary skills competence.
2. Obtainment of local and foreign scholarship grants
3. Attendance to conferences and seminars and encourage personnel to submit research articles, posters to various conferences.
4. Coaching and mentoring
5. Access to information thru subscription in research/technical journals.
6. For equipment – annual preventive maintenance.

TECHNICAL EXPERTS-RESOURCE PERSONS DURING TRAININGS

Dr. Vermando M. Aquino and Ms. Fides Angeli Zaulda (UP Diliman – NIMBB) Resource Person on Abaca Virus Indexing & Detection

Dr. Evalour T. Aspuria (UPLB- iCrops) Resource Person on Abaca Tissue Culture

Dr. Olivia P. Dalmacio (UPLB – IPB) Resource Person on *In vitro* Germplasm Conservation

Prof. Nestor C. Altoveros (UPLB- iCrops) Resource Person on Abaca Germplasm Characterization, Genebanking and Documentation

Prof. Teresita H. Borromeo (UPLB- iCrops) Resource Person on Abaca Germplasm Characterization, Genebanking and Documentation

Dr. Frederick F. Rodrigo (MMSU) Resource Person on Technical Writing

Dr. Edison C. Riñen (PHILFIDA) Resource Person on Experimental Design and Statistical Analysis

Ms. Marcellas Antonia Barrogo (DA-BPO) Resource Person on Packaging Proposals for DA-BAR & DA-BPO

POST-TRAINING EVALUATION QUESTIONAIRRE

POST-TRAINING EVALUATION QUESTIONNAIRE

Instructions: Please give your answers or comments in writing, or indicate the extent to which you gained confidence in the topics you learnt for the training that you attended.

Title of Training: Training on Micropropagation
Date of Training:
Place of Training: Legazpi City

A. To what extent did you gain confidence in the following topics that you learned during the training?						
Shoot-tip culture		Not at all	Not well	Neutral	Well	Very well
1	Sample collection and sterilization and explants preparation	1	2	3	4	(5)
2	Initial culturing, subculturing/transferring and rooting	1	2	3	4	(5)
Inflorescence culture		Not at all	Not well	Neutral	Well	Very well
1	Sample collection and sterilization and explants preparation	1	2	3	(4)	5
2	Initial culturing of inflorescence	1	2	3	(4)	5
B. Training effectiveness		Not at all	Not well	Neutral	Well	Very well
1. Do you think that the aims of the training matched with your needs?		1	2	3	(4)	5
2. Does this training improve your work performance knowing that you have developed a skill?		1	2	3	(4)	5
3. Does this training boost your confidence in micropropagation knowing that you know the science of what you are doing and not merely following a written protocol.		1	2	3	(4)	5
4. Does this training help you to have the attitude of commitment in performing virus detection knowing that you are doing a very important task		1	2	3	4	(5)

C. In the future, are you still interested to be trained? Yes No

If yes, what particular topic?

inflorescence

POST-TRAINING EVALUATION QUESTIONNAIRE

Instructions: Please give your answers or comments in writing, or indicate the extent to which you gained confidence in the topics you learnt for the training that you attended.

Title of Training: Training on Micropropagation
Date of Training: May 19 - 21, 2016
Place of Training: Albay Tissue Culture Laboratory, Legazpi City

A. To what extent did you gain confidence in the following topics that you learned during the training?						
Shoot-tip culture		Not at all	Not well	Neutral	Well	Very well
1	Sample collection and sterilization and explants preparation	1	2	3	4	(5)
2	Initial culturing, subculturing/transferring and rooting	1	2	3	4	(5)
Inflorescence culture		Not at all	Not well	Neutral	Well	Very well
1	Sample collection and sterilization and explants preparation	1	2	3	4	(5)
2	Initial culturing of inflorescence	1	(2)	3	4	5
B. Training effectiveness		Not at all	Not well	Neutral	Well	Very well
1. Do you think that the aims of the training matched with your needs?		1	2	3	4	(5)
2. Does this training improve your work performance knowing that you have developed a skill?		1	2	3	4	(5)
3. Does this training boost your confidence in micropropagation knowing that you know the science of what you are doing and not merely following a written protocol.		1	2	3	4	(5)
4. Does this training help you to have the attitude of commitment in performing virus detection knowing that you are doing a very important task		1	2	3	4	(5)

C. In the future, are you still interested to be trained? (Yes) No

If yes, what particular topic?

Culture of Different Fiber Crops,

If yes, what particular topic?

Molecular Characterization & Varietal Identification of Abaca Germplasm Collection.

IEC MATERIALS

Harmonized Tissue Culture Protocol for PhilFIDA Laboratories

"Halamang Hibla: Yaman ng Bayan, Biyaya ng Kalikasan"

water

n cover and
ood (LFH)

2drops per liter of Tween 20 for 10 min with continuous agitation
- Rinse 3x with sterilized distilled water/ sterilized purified water

4

els
s and tow-

5


Republic of the Philippines
Department of Agriculture
PHILIPPINE FIBER INDUSTRY DEVELOPMENT AUTHORITY
3F PCAF Building, DA Compound, Elliptical Road, Diliman, Quezon City
Research Division
ESTABLISHMENT AND MAINTENANCE OF ABACA FIELD GENEBANK
"Halamang Hibla: Yaman ng Bayan, Biyaya ng Kalikasan"
ABACA
SCRIPTORS LIST
ESCRIPTORS LIST
Location :
Date evaluated:
3.Drooping
4. Other
2. Intermediate
3. Drooping
2. Oblong
3.Elongated
Tangongon
Rounded
Oblong
Elongated

Department of Agriculture
PHILIPPINE FIBER INDUSTRY DEVELOPMENT AUTHORITY
3F PCAF Bldg, Elliptical Road, Diliman, Quezon City

IMMUNOLOGY AND MOLECULAR BIOLOGY LABORATORY (IMBL) SAFETY MANUAL

LC Galvez, CFC Barbosa, JL Catalla

- Always check the hazard warning symbols on reagent bottles to warn of specific dangers and must be heeded.

Protocols for Abaca Virus Detection

LC Galvez, VM Aquino and JL Catalla

"The Welfare of the Philiippine Fibercrop Farmers and the Indigenous People (IPs) are our Utmost Concern"

dustry is challenged by
due to occurrence of
eaded diseases of abaca
baca Bunchy top Virus
rus (BBTV), *Sugar Cane*
) and *Banana Bract Mo-*

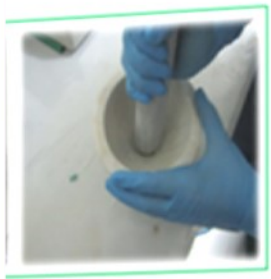
(ABTV) and *Banana*
)

) (Figure 1) is caused by
and banana bunchy top
ıe family of *Nanoviruses*

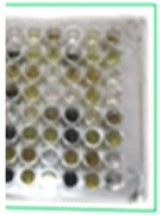
Figure 1. Bunchy-top infected
(A) Abaca (B) Banana
(C) Aphids (*Pentalonia nigronervosa* Coq) in abaca plant

1

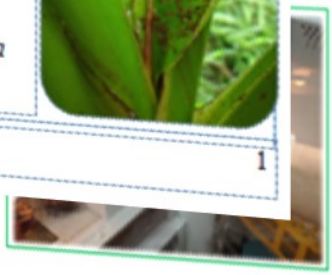
using mortar and



ole per well follow-

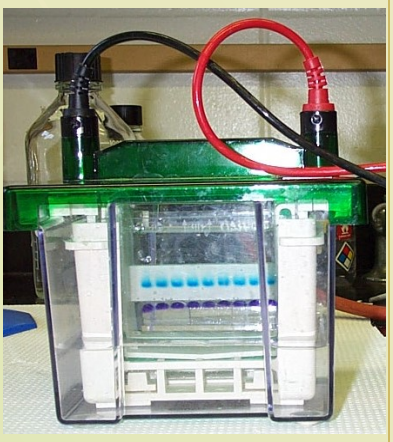


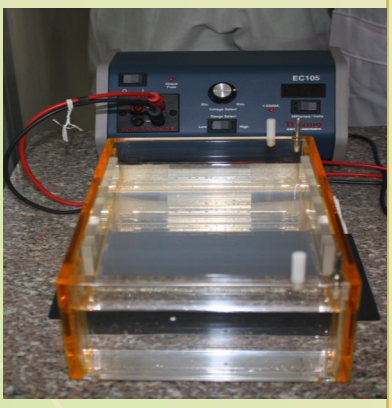
C or overnight at

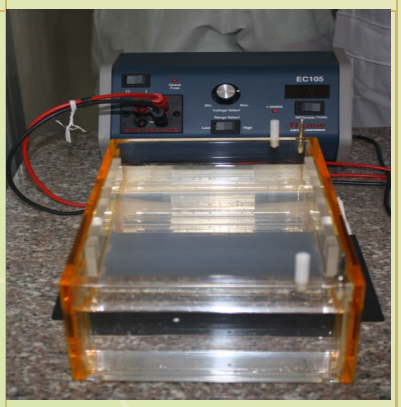


17

Table 1. List of equipment purchased to upgrade nine (9) PhilFIDA Laboratories under the Project DA-BAR/BIOTECH C1506

UNITS	LOCATION	SPECIFICATION	QTY	DOCUMENTATION
PAGE Apparatus	Immunology/ Molecular Biology Laboratories (IMBL), Quezon City	Contains at least 2-gel vertical, 1.0 mm gel thickness, includes casting stand, 2 casting frames, 10-well combs, 5 short plates, and 5 spacer plates (with FREE Stain-free cast acrylamide starter kit, 10%); Mini Electrophoretic transfer cell, gel transfer cell, for two 10 x 7.5 cm gels, includes 2 gel holder cassettes, foam pads, electrodes, tank, blue cooling unit, lid with cables; Power Supply, 220–240 V, power supply for high-current applications such as western blotting, includes power cord	1 unit	
Refrigerated Centrifuge	IMBL, Quezon City	Max Speed: at least 14000rpm; Capacity: at least 24 x 1.5/2.0 mL; rotor with lid; Noise Level: not more than 50dBA; Timer: 1 to 99 min.,1 min. increment plus "hold"; Temp set range: set from -9°C to 40°C per 1°C inc; With certificate of compliance or markings Electrical requirements: 230V 50/60Hz	1 unit	
Refrigerators	TCL, Leyte TCL, Legazpi TCL, Sorsogon TCL, Catanduanes TCL, Davao	9 cu ft. 220 volts double door, energy saving type.	5 units (1 each lab)	

UNITS	LOCATION	SPECIFICATION	QTY	DOCUMENTATION
Thermal Cycler	IMBL, Quezon City/ Diagnostic Laboratories, Davao City	Brand new and branded; 96-well, 0.2 mL Blocks; PCR volume range: 10-100ul; Reaction speed: Controllable ramp Block Range: 10°C (5°C zone to zone, with at least 3 zones); Temperature accuracy: +/- 0.25°C; Temperature range: 0 to 100°C; Program features: Program overwrite protection; Auto start (after power outages); Program editable during run; One touch incubation; Instrument memory: On board and USB; Display interface: at least 8-inch colored touch screen; Power: 100-240 V, 50-60Hz, max 600W; Data connectivity: Ethernet or WI-FI	1 unit	
Electrophoresis System	Diagnostic Laboratories (DL), Davao City	Compact medium system with gel casting system (WxDxH, cm = 17.7 x 25.8 x 10.6); Chamber with safety lid; UV transparent tray for gel size 12.4 cm x 14.5 cm; 2 combs, 18 wells, 1.0 mm thick; Casting chamber for gel tray 12.4 cm x 14.5 cm; Power pack with 100-240V, max 300V, 400mA, 60W	1 unit	
Gel Documentation System	DL, Davao City	Touch Imaging System; 302 nm - universal voltage with high resolution, 5MP or more, camera, scientific grade sensor; No installation necessary. Build in epi-blue light ideal for applications requiring; 490nm light source, 302 or 365nm UV transillumination; Pre-focused sytem for easy image capture, no focus required; small foorprints; Pull out UV for visualizing and cutting bands; Filter: 3 positions -can be used with SYBR safe; diamond dye		

UNITS	LOCATION	SPECIFICATION	QTY	DOCUMENTATION
Thermal Cycler	IMBL, Quezon City/ Diagnostic Laboratories, Davao City	Brand new and branded; 96-well, 0.2 mL Blocks; PCR volume range: 10-100ul; Reaction speed: Controllable ramp Block Range: 10°C (5°C zone to zone, with at least 3 zones); Temperature accuracy: +/- 0.25°C; Temperature range: 0 to 100°C; Program features: Program overwrite protection; Auto start (after power outages); Program editable during run; One touch incubation; Instrument memory: On board and USB; Display interface: at least 8-inch colored touch screen; Power: 100-240 V, 50-60Hz, max 600W; Data connectivity: Ethernet or WI-FI	1 unit	
Electrophoresis System	Diagnostic Laboratories (DL), Davao City	Compact medium system with gel casting system (WxDxH, cm = 17.7 x 25.8 x 10.6); Chamber with safety lid; UV transparent tray for gel size 12.4 cm x 14.5 cm; 2 combs, 18 wells, 1.0 mm thick; Casting chamber for gel tray 12.4 cm x 14.5 cm; Power pack with 100-240V, max 300V, 400mA, 60W	1 unit	
Pipettors	IMBL, Quezon City, DL, Legazpi DL,Davao City DL, Leyte	set of Pipettors includes: Pipette 0.2 - 2.0 ul Pipette 0.5 - 10.0 ul Pipette 2.0 - 20.0 ul Pipette 10 - 100 ul Pipette 100 - 1000 ul Tips: 10, 2 x 96; 200, 1 x 96, 1000, 1 x 96 Pipette stand, pen and brochure	4 units (1 each lab)	

UNITS	LOCATION	SPECIFICATION	QTY	DOCUMENTATION
Analytical Balance	TCL, Leyte TCL, Legazpi TCL, Sorsogon TCL, Catanduanes TCL, Davao	Weighing capacity: 220g Readability: 0.0001g (0.1mg) Pan size: 90mm dia Linearity: 0.0001g (0.1mg) Response time: 2.5 sec Calibration: Internal Power supply: 230V, 60Hz	5 units (1 each lab)	
Digital Weighing Scale	TCL, Leyte TCL, Legazpi TCL, Sorsogon TCL, Catanduanes TCL, Davao	Compact medium system with gel casting system (WxDxH, cm = 17.7 x 25.8 x 10.6); Chamber with safety lid; UV transparent tray for gel size 12.4 cm x 14.5 cm; 2 combs, 18 wells, 1.0 mm thick; Casting chamber for gel tray 12.4 cm x 14.5 cm; Power pack with 100-240V, max 300V, 400mA, 60W	5 units (1 each lab)	
pH Meter	TCL, Leyte TCL, Legazpi TCL, Sorsogon TCL, Catanduanes TCL, Davao	Up to 6-point calibration with auto buffer recognition; Electrode diagnosis with pH display; Calibration up to 5 custom pH buffers; Memory capacity up to 500 data points; Alarm for calibration due; Range: -2.0 to 20.0 pH; Resolution: 0.1/0.01/0.001 pH; Accuracy: +/- 0.002 pH + 1 LSD; Includes cable, 100/240 VAC power adapter and an integral electrode holder	5 units (1 each lab)	
Split-type air-conditioning units	TCL, Leyte TCL, Legazpi TCL, Sorsogon TCL, Catanduanes TCL, Davao	1.5 HP, inverter type	5 units (1 each lab)	 

Table 2. Trainings conducted to enhance capability of laboratory and research staff under the Project DA-BAR/BIOTECH C1506

TRAINING	DATE CONDUCTED	SITE	NO. OF PARTICIPANTS		COST	REMARKS
			Male	Female		
Training on Virus Detection Techniques in Abaca	May 16-18, 2016	Albay Diagnostic Lab. Legazpi City	3	11	710,984.00	The project target for these trainings is only 10 participants per training but more participants were trained due to the training needs of the other research personnel PhilFIDA provided additional TEV from its 2016 Regular
Training on Abaca Tissue Culture Techniques	May 19-21, 2016	Albay TCL Legazpi City	3	14		
Training on Abaca Characterization, Genebanking and PGR Documentation	May 23-27, 2017	SFESS, Casiguran, Sorsogon	12	10		
Training on Technical Writing, Research Methods and Statistics and Project Management	July 25-31, 2016	MMSU, Batac Ilocos Norte	16	25	641,915.02	

E. PROJECT MANAGEMENT

EXECUTIVE SUMMARY

The project is funded by the Department of Agriculture-Biotech Program Office under the Institutional Capacity Enhancement. The project duration is from February 2016 to February 2017 with a total budget of PhP5.82M. This served as an important vehicle to enhance the capability of PhilFIDA research personnel in the delivery of services for virus detection and distribution of virus-free abaca plantlets. A total of 35 pieces of laboratory equipment were procured for the Tissue Culture Laboratories (TCLs), Diagnostic Laboratories (DLs) and Immunology and Molecular Biology Laboratory (IMBL). The procurement of new pieces of equipment at the Tissue Culture Laboratories such as analytical balance, digital weighing scales and pH meter, has allowed for quicker and accurate weighing of chemicals which is vital to the growth of the cultures. In addition, procurement of new pieces of equipment for the diagnostic laboratories allowed a faster detection method using PCR.

Three (3) units of protected nurseries/screenhouses of 3 TCLs were built/rehabilitated in Virac, Catanduanes; Casiguran, Sorsogon; and Bago-Oshiro, Davao .

Moreover, PhilFIDA research personnel were trained on virus detection, tissue culture technique, germplasm characterization, and technical writing and statistical methods. Although the laboratory staff are already working in the laboratories for a long time, they never had a formal training on tissue culture and virus detection. Their knowledge was just handed over by the senior staff of the laboratories, most of whom had retired The series of trainings gave them a deeper understanding and greater confidence in the science of their work.

Republic of the Philippines
DEPARTMENT OF AGRICULTURE
Biotechnology Program Office
2nd Floor BSWM Bldg., Elliptical Rd., Diliman, Quezon City
Telefax: (02) 927-0426/922-0057 Email: biotechpiu@gmail.com

ESMES FORM 5a
(Rev. Dec. 2015)

PHYSICAL ACCOMPLISHMENT REPORT
For the period: February 2016 to December 2019

Project Title : ENHANCING PHILFIDA'S CAPABILITY ON VIRUS DETECTION AND ABACA MICROPROPAGATION FOR MORE EFFECTIVE AND EFFICIENT DELIVERY OF SERVICES

Project Leader: Leny C. Galvez

Implementing Agency: Philippine Fiber Industry Development Authority

Objectives	Activities	Accomplishments *(must be descriptive and quantitative)*		% Completion (Cumulative)	Problem/s Encountered	Action/s Taken	Remarks/ Recommendations
		Targeted	Actual				
1. To upgrade PhilFIDA Immunology, Diagnostic and Tissue Culture Laboratories	Procured 35 units of laboratory equipment	35	41	117%			
	Rehabilitated three (3) protected nurseries	3	3	100%			
2. To enhance the technical skills and competence of laboratory staff of Immunology, Diagnostic and Tissue culture laboratories.	Conducted four (4) capability enhancement trainings	4	4	100%			
	No. of personnel trained	10,10,10,10	14,17,22,41	More than 100%			PhilFIDA augmented the budget out of its 2016 budget to defray the TEV of the additional personnel
	Conduct monitoring	4	4	150%			
	Report submission	4	4	100%			

Prepared by:

LENY C. GALVEZ
Project Leader
June 2020
Date

Noted by:

KENNEDY T. COSTALES
Executive Director
Date

Republic of the Philippines
DEPARTMENT OF AGRICULTURE
Biotechnology Program Office
2nd Floor BSWM Bldg., Elliptical Rd., Diliman, Quezon City
Telefax: (02) 927-0426/922-0057 Email: biotechpiu@gmail.com

ESMES FORM 5b
(Rev. Dec. 2015)

S REPORT
For the Period: February 2016-December 2019

Project Title: **ENHANCING PHILFIDA'S CAPABILITY ON VIRUS DETECTION AND ABACA MICROPROPAGATION FOR MORE EFFECTIVE AND EFFICIENT DELIVERY OF SERVICES**

Project Leader: **Leny C. Galvez**

Implementing Agency: **Philippine Fiber Industry Development Authority**

Category	Approved Budget		Total Budget Released	Expenditures		Balance		Problems Encountered	Action/s Taken	Remarks/ Recommendations
	Whole Duration of the Project	Year under Review		Cumulative	Year under Review	To Date	Year under Review			
(1)	(2)	(3)	(4)	(5)	(6)	(7) = (4) – (5)	(8) = (3) – (6)	(9)	(10)	(11)
MOOE	1,720,000.00	1,720,000.00	1,720,000.00	1,597,890.76	582,000.00	122,109.24				
CAPITAL OUTLAY	4,100,000.00	4,100,000.00	4,100,000.00	3,999,688.75		100,311.25				
TOTAL	5,820,000.00	5,238,000.00	5,238,000.00	5,597,579.51	582,000.00	222,420.49				

PREPARED BY:

LENY C. GALVEZ
Project Leader

Date

CERTIFIED CORRECT:

HONESTO C. TABUZO, JR
Chief Accountant

Date

Notes:
(1) Category: (a) Personnel Services (PS), (b) Maintenance and Other Operating Expenses (MOOE), (c) Capital Outlay (CO)
(2) Total approved budget for the whole duration of the project
(3) Total approved budget for the current year
(4) Total amount of budget released since project start up
(5) Cumulative expenses since project start up
(6) Expenses incurred for the period covered
(7) Balance to date is equals to (4) Total Amount of Budget Released less (5) Cumulative Expenditures
(8) Balance for Year under Review is equals to (3) Approved Budget for the Current Year less (6) Expenditures this Year under Review

Republic of the Philippines
DEPARTMENT OF AGRICULTURE
Biotechnology Program Office
2nd Floor BSWM Bldg., Elliptical Rd., Diliman, Quezon City
Telefax: (02) 927-0426/922-0057 Email: biotechpiu@gmail.com

ESMES FORM 5c
(Rev. Dec. 2015)

CAPITAL OUTLAY INVENTORY
as of _February 2017

Project Title: ENHANCING PHILFIDA'S CAPABILITY ON VIRUS DETECTION AND ABACA MICROPROPAGATION FOR MORE EFFECTIVE AND EFFICIENT DELIVERY OF SERVICES

Project Leader: Leny C. Galvez

Implementing Agency: Philippine Fiber Industry Development Authority

Item Code *(provided by DA Biotech PIU)*	**Item/ Equipment**	**Specifications**	**Quantity**	**Unit Cost**	**Total Amount**	**Date Procured**	**MR to** (Name of Person/Office/ Position/ Designation)	**Remarks**
DA-BIOTECH-C1506-01	**PAGE Apparatus**	Contains at least 2-gel vertical, 1.0 mm gel thickness, includes casting stand, 2 casting frames, 10-well combs, 5 short plates, and 5 spacer plates (with FREE Stain-free cast acrylamide starter kit, 10%); Mini Electrophoretic Transfer Cell, gel transfer cell, for two 10 x 7.5 cm gels, includes 2 gel holder cassettes, foam pads, electrodes, tank, blue cooling unit, lid with cables; Power Supply, 220–	1	194,800.00	194,800.00	August 2016	Leny C. Galvez	

		240 V, power supply for high-current applications such as western blotting, includes power cord						
DABIOTECH-C1506-02	**Refrigerated Centrifuge**	Max Speed: at least 14000rpm Capacity: at least 24 x 1.5/2.0 mL; rotor with Lid Noise Level: not more than 50dBA Timer: 1 to 99 min.,1 min. increments plus "hold" Temp Set Range: set from -9oC to 40oC per 1oC inc With certificate of compliance or markings Electrical Requirements: 230V 50/60Hz	1	256,891.25	256,891.25	July 2016	Leny C. Galvez	
DABIOTECH-C1506-03	**Thermal Cycler**	Brand new and branded 96-well, 0.2 mL Blocks PCR volume range: 10-100ul Reaction Speed: Controllable ramp Block Range: 10oC (5oC zone to zone, with at least 3 zones) Temperature	2	275,000.00	550,000.00	December 2016 February 2017	Leny C. Galvez Analyn D. Bolivar	

		accuracy: +/-0.25oC Temperature range: 0 to 100oC Program features: Program overwrite protection Auto start (after power outages) Program editable during run One touch incubation Instrument memory: On board and USB Display interface: at least 8 inch color. Colored touch screen Power: 100-240 V, 50-60Hz, max 600W Data connectivity: Ethernet or WI-FI						
DABIOTECH-C1506-04	**Electrophoresis System**	Compact medium system with gel casting sytem Chamber with safety lid (WxDxH, cm = 17.7 x 25.8 x 10.6) UV transparent tray for gel size 12.4 cm x 14.5 cm, 2 combs, 18 wells, 1.0 mm thick Casting chamber for gel tray 12.4 cm x 14.5 cm Power pack with 100-240V, max 300V,	1	80.931.75	80,931.75	February 2017	Analyn D. Bolivar	

		400mA, 60W						
DABIOTECH-C1506-05	**Gel Documentation System**	Touch Imaging System 302 nm - universal voltage with high resolution, 5MP or more, camera, scientific grade sensor; No installation necessary Build in epi-blue light ideal for applications requiring 490nm light source, 302 or 365nm UV transillumination Pre-focused sytem for easy image capture, no focus required; small footprints Pull out UV for visualizing and cutting bands Filter: 3 position can be used with SYBR safe; diamond dye	1	457,500.00	457,500.00	February 2017	Analyn D. Bolivar	
DABIOTECH-C1506-06	**Pipettors**	set of Pipette includes Pipette 0.2 - 2.0 ul Pipette 0.5 - 10.0 ul Pipette 2.0 - 20.0 ul Pipette 10 - 100 ul Pipette 100 - 1000 ul Tips: 10, 2 x 96; 200, 1 x 96, 1000, 1 x 96 Pipette stand, pen and brochure	4 sets	41,760.00	167,040.00	December 2016	Leny C. Galvez Irma M. Navarro Rosedina P. Corsino Analyn D. Bolivar	

DABIOTECH-C1506-07	**Analytical Balance**	Weighing capacity: 220g Readability: 0.0001g (0.1mg) Pan Size: 90mm dia Linearity: 0.0001g (0.1mg) Response Time: 2.5 sec Calibration: Internal power supply: 230V, 60Hz	5	82,241.09	411,205.45	February 2017 March 2017	Irma M. Navarro, Lorgen Z. Garcia, Josephine R. Escalante, Rosedina P. Corsino Analyn D. Bolivar	
DABIOTECH-C1506-08	**Digital Weighing Scale**	Weighing capacity: at least 800g Readability: 0.01g Pan size: 150 mm diameter Linearity: 0.03g Response time: 1 sec Calibration: External power supply: 230V, 60Hz	5	41,836.86	209,184.30	April 2017	Irma M. Navarro, Lorgen Z. Garcia, Josephine R. Escalante, Rosedina P. Corsino Analyn D. Bolivar	
DABIOTECH-C1506-09	**pH Meter**	Up to 6-point calibration with auto buffer recognition Electrode diagnosis with pH display Calibration up to 5 custom pH buffers Memory capacity up to 500 data points Alarm for calibration due Range: -2.0 to 20.0 pH Resolution:	5	35,000.00	175,000.00	May 2017	Irma M. Navarro, Lorgen Z. Garcia, Josephine R. Escalante, Rosedina P. Corsino Analyn D. Bolivar	

DABIOTECH-C1506-10	**Split-type air-conditioning units**	0.1/0.01/0.001 pH Accuracy: +/- 0.002 pH + 1 LSD Includes cable, 100/240 VAC power adapter and an integral electrode holder 1.5 HP, inverter type	1 TCL, Leyte 1 TCL, Legazpi 1 TCL, Sorsogon 1 TCL, Catanduanes 1 TCL, Davao	44,584.00 49,950.00 49,950.00 49950.00 43,730.00	44,584.00 49,950.00 49,950.00 49,950.00 43,730.00	August 2016 October 2016 October 2016 October 2016 June 2016	Irma M. Navarro, Lorgen Z. Garcia, Josephine R. Escalante, Rosedina P. Corsino Analyn D. Bolivar	
DABIOTECH-C1506-11	**Refrigerators**	9 cu ft. 220 volts double door, energy saving type.	1 TCL, Leyte 1 TCL, Legazpi 1 TCL, Sorsogon 1 TCL, Catanduanes 1 TCL, Davao	21,708.00 19,995.00 19,995.00 19,995.00 17,600.00	21,708.00 19,995.00 19,995.00 19,995.00 17,600.00	August 2016 October 2016 October 2016 October 2016 June 2016	Irma M. Navarro, Lorgen Z. Garcia, Josephine R. Escalante, Rosedina P. Corsino Analyn D. Bolivar	
DABIOTECH-C1506-_____	**8 Multichannel**	30-300ul	4	34,499.00	137,996.00	November 2017	Leny C. Galvez	
DABIOTECH-C1506-_____	**Laboratory oven**	Capacity: 60L Convention Technology Connection Temperature Range: at least 50° C - 250° C Spatial Temperature deviation at 150°C at least + 4.4°C	1	94,990.50	94,990.50	January 2018	Leny C. Galvez	

		Temperature deviation overtime at 150°C at least 0.4°C Chamber volume: 65L Dimension chamber, mm/n (WxHxD) 328x480x414 Exterior 2, mm/n (WxHxD) 530x720x565 Number of shelves: at least 2/max 13 Max. shelf load: at least 25kg						
DABIOTECH-C1506-_____	**Freezer**	14cu. ft. No frost Dual function – freezer or chiller Digital Temp Control Door alarm	1	31,350.00	31,350.00	May 2019	Leny C. Galvez	
DABIOTECH-C1506-12	**Rehabilitation of Protected Nurseries**		TCL, Legazpi TCL, Catanduanes TCL, Davao	300,000.00 300,000.00 300,000.00	300,000.00 300,000.00 300,000.00	November 2016 December 2016		

Prepared by:

LENY C. GALVEZ
Project Leader

Date

Noted by:

KENNEDY T. COSTALES
Agency Head

Date

PERSONNEL COMPLEMENT

Leny C. Galvez	Project Leader
Jose L. Catalla	Chief, Research Division
Robert G. Atienza	Supervising Science Specialist
Cris Francis Barbosa	Science Research Specialist II
Gilda G. Alforja	Project Assistant
Victor Y. Romano	Photographer