THE BELIZE MEDFLY PROGRAMME

A Case Study on Maintaining a Medfly Surveillance and Eradication Programme

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LIST OF ACRONYMS

BABCO	Belize Agri-business Company Project
BAHA	Belize Agricultural Health Authority
FAO	Food and Agriculture Organization
GIS	Geographic Information System
IDB	Inter-American Development Bank
IPPC	International Plant Protection Convention
ISPM	International Standard for Phytosanitary Measures
MOSCAMED	Programa Mosca del Mediterráneo
OIRSA	International Regional Organization for Plant and Animal Health
SIB	Statistical Institute of Belize
SPS	Sanitary and Phytosanitary
TCP	Technical Cooperation Project
USA	United States of America
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
USDA/APHIS	United States Department of Agriculture/ Animal and Plant Health Inspection Service
WTO	World Trade Organization

1. CONTENTS

1. EXECUTIVE SUMMARY

Belize detected the Mediterranean fruit fly in 1987, ten (10) years after implementing a surveillance programme geared towards determining the status of the pest. The Mediterranean fruit fly is considered one of the most destructive of pests and it was for that reason that, once detected, the United States of America (USA) placed a ban on all Medfly host commodities from Belize. In 1989, with assistance from the Food and Agriculture Organization of the United Nations (FAO) and the United States Department of Agriculture (USDA), the Government of Belize implemented a Comprehensive Surveillance Programme. The United States of America recognized Belize as free of the pest on August 28, 2001. The country declared itself free on April 28, 2007 in Statutory Instrument No. 44 of 2007. The programme costs the government BZ$400,000.00[1] annually. However, market access generates average foreign exchange earnings of BZ$30 million dollars (US$15 million) per year. Additional benefits derived from the programme include the direct employment of hundreds of Belizeans every year and trickle effects to other businesses. The programme also saves other industries, such as the citrus subsector, estimated management costs of more than one million dollars per year were the pest ever to become established. The overall cost benefit is estimated to be BZ$140.00 for every dollar

[1] Two Belize Dollars equal one United States Dollar.

spent. The recognition of the country as a pest-free area has given investors confidence to engage in the production and export of lucrative host commodities. Belize continues to seek collaboration with regional and international agencies to enhance the programme's effectiveness. It also aims to use new technologies to further enhance the programme, develop new products for export, and attract new investment in other commodities to maximize its pest-free status.

2. INTRODUCTION

Belize is located in the northeast corner of Central America, between Mexico and Guatemala. It has a land area of 23,963 square km and is home to a mixed ethnic population of 317,000 (SIB, 2007). The national economy is based on the primary sector, especially agriculture, which was worth three hundred and forty-nine million Belize dollars (BZ$349 million) in 2008, with the three traditional crops - sugarcane, citrus fruits and bananas - accounting for one hundred and eighty million Belize dollars (BZ$180 million) (Ministry of Agriculture, 2008).

Diversification to non-traditional crops, with prices for the traditional commodities in decline, was seen as a way to generate jobs, reduce reliance on sugarcane, citrus fruits and bananas and generate foreign exchange. However, one of the major constraints to the export of agricultural products is the presence of endemic pests or exotic pests that are introduced and could pose phytosanitary risks to the country's major trading partners. Some of the most devastating pests of worldwide concern are those in the Tephritidae family of insects, commonly known as fruit flies, of which the most devastating is the Mediterranean fruit fly, *Ceratitis capitata* (Wiedemann).

In 1977, a Medfly surveillance program was initiated with the assistance of the Animal and Plant Health Inspection Service of the United States Department of Agriculture (USDA/APHIS). It had two major objectives: first, to ascertain that the Medfly was not present in Belize and, second, to establish a reliable surveillance program capable of detecting any Medfly introduction in Belize before an endemic population could become established. Ten years elapsed before the first Medfly was found,

in March 1987, in the southern region of the country. Due to the absence of a comprehensive national surveillance programme, exports of Medfly host commodities from Belize such as papaya at that time became inadmissible and significant investments were lost. As a result, in 1989 the program was modified and adjusted through a Technical Cooperation Project (TCP) with the FAO, in order to quickly detect and eradicate any Medfly introduction before it could become established.

The present initiative consists of a Comprehensive National Surveillance program that deploys and services Medfly traps along designated trapping routes, a Medfly Eradication Action Plan that includes different measures to contain, control and eradicate any Medfly introduction, and an Export Certification Program for the export of Medfly host commodities. The National Quarantine System serves as the first line of defence and complements the Medfly programme.

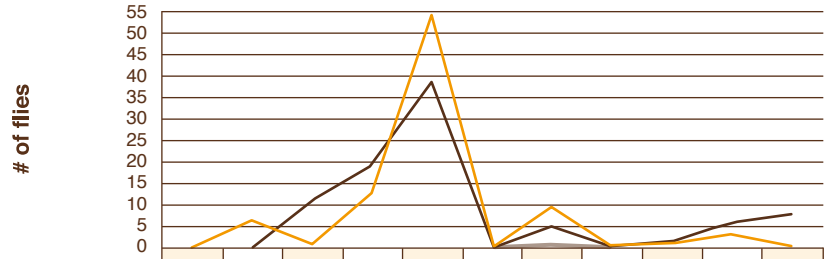
The Government of Belize, with a loan from the Inter-American Development Bank (IDB), modernized its agricultural health services in 2000 with the establishment of the Belize Agricultural Health Authority (BAHA). The Authority became the implementing agency responsible for the management of all aspects of the Medfly programme. On August 28, 2001, Belize was officially recognized as a Medfly-Free Country by the United States Department of Agriculture (USDA). This was a significant recognition, as it meant that Medfly host commodities, exports of which had previously been limited to only four districts, could now be exported from all districts of Belize. This was followed by Belize declaring itself Medfly free on April 28, 2007, in Statutory Instrument No. 44 of 2007, in accordance with International Standard for Phytosanitary Measures (ISPM) No. 4: Requirements for the Establishment of Pest Free Areas and ISPM No. 26: Establishment of Pest Free Areas for Fruit Flies of the Family (Tephritidae).

3. PRESENT PHYTOSANITARY STATUS

Since the first Medfly interception in 1987, the plant health services of Belize, either under the Ministry of Agriculture or BAHA, have been successful in intercepting all subsequent Medfly incursions and eradicating them effectively. The historical data indicate that the pest has never become established and the introductions have been limited only to a certain area of the country. The data have been useful as a management tool to determine the areas of higher probability of introduction as well as the periods in the year of high activity. Surveillance activities have been geared to respond to these factors.

Table 1 below summarizes the Medfly capture data from 2000-2009, by district. The trend shows that the two southern districts are the ones prone to frequent introductions. These two zones comprise the main entry point of migrants and produce from Central America. Three official ports of entry and many unofficial entry points are located within this region, and there is an increase in the movement of people from the neighbouring countries of Honduras and Guatemala into Belize.

Figure 1



	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Belize	0	0	0	0	0	0	1	0	0	0	0
Cayo	0	0	0	0	0	0	0	0	0	0	0
Corozal	0	0	0	0	0	0	0	0	0	0	0
Orange Walk	0	0	0	0	0	0	0	0	0	0	0
Stann Creek	0	0	11	19	39	0	5	0	2	6	8
Toledo	0	6	1	13	54	0	9	0	1	3	1

Based on the relevant international standards for establishing and maintaining pest-free areas, sporadic introductions do not result in the loss of pest-free status as long as remedial actions are taken. Under this new procedure, only the immediate area is considered affected. Once corrective measures have been applied, pest free status is once again achieved.

Only the USA has officially recognized the entire territory of Belize as Medfly free. However, other trading partners also recognize the status in practice, since imports of host commodities are accepted. Guatemala has accepted fresh oranges in the past, as have Martinique, Guadeloupe and Barbados. Fresh papayas are exported to the USA and Canada. Mexico

accepts a few in-transit consignments, en route to the USA. However, these would be rejected if Belize were considered an infected country. In 2005, a major initiative was launched for mutual recognition of the pest-free areas throughout Belize and the Department of Peten in Guatemala. Due to political changes in both countries, the process was halted but all the groundwork and documentation were completed. This initiative may be resumed in the near future with the signing of the Partial Scope Agreement between the Government of Belize and the Republic of Guatemala.

4. BENEFITS OBTAINED FROM THE PROGRAMME

Fruit flies cause direct damage to fruits produced both on a commercial scale and in backyards, for home consumption. Actions to manage these pests result in the use of special insecticides and baits that are often very expensive. The presence of the Medfly invariably results in market restrictions for most host commodities, and therefore, reduces the possibility of trade opportunities for commodities that may otherwise have comparative advantages. At the local level, fruit production is affected by these pests, and, by extension, the amount of fruit available for local consumption is reduced. The decision to create or to maintain an area free of the Medfly produces social, economic, commercial and other benefits for a country or region.

4.1. Social

The direct social benefits include the human-related activities associated with industries that have arisen as a direct result of the establishment of the pest-free area. The indirect benefits stem from the increase in production and the availability of fruits, which contributes to the local diet, and the drastic reduction in the use of agrochemicals to combat the pest.

Belize's Medfly-free status resulted in market access opportunities for non-traditional crops, including papayas and habanero peppers. Papaya exports began in 1990, through the auspices of the Belize Agri-business Company (BABCO) Project, funded by the United States Agency for International Development (USAID). Papayas are shipped fresh with no treatments other than regular, post-harvest, anti-fungal treatments. This is a comparative advantage that Belize has over papaya exports from Medfly-contaminated areas that require special treatments, such as hot water dips, which increase costs and reduce quality.

Many companies and small farmers became involved in production, resulting in a gradual increase in the area under production and volumes of export. In 2007, before the effects of Hurricane Dean, Belize was the second major exporter of fresh papayas to the USA. The social benefits of the status have translated into direct employment - almost fifteen hundred (1500) direct jobs, both in production and at the packinghouses in the Orange Walk and Corozal districts. The rule of thumb in the industry is that one worker is required for every acre of productive grove, which includes packing. The average weekly salary of a field worker and packinghouse personnel ranges from BZ$150-$200 but can be as high as BZ$400. This income generally signifies the bulk of average household earnings for the two districts. With families comprised, on average, of 4.5 persons, the papaya industry benefits six thousand, seven hundred and fifty (6750) people directly. Along with other industries that provide employment in the district (sugarcane and the free zone), Corozal has an unemployment rate of 3%, the lowest in Belize (SIB, 2007).

Other related indirect jobs include those of drivers for the trucking company that makes an average of 30-50 round-trips per week to the

Port of Belize. The packinghouses also provide opportunities for local entrepreneurs, mostly single mothers who prepare and sell food to packinghouse workers.

The second commodity that benefited from the pest-free status was the habanero industry. Unlike papayas, this small-scale industry has suffered from severe limitations, to the point where at times it has disappeared and then resurfaced through some ill-coordinated initiatives that invariably failed. The failure of these initiatives has had absolutely nothing to do with the pest-free status but rather has been due to other factors, including the poor marketing and coordination of production. However, in the past exports were significant, with production reaching 1.5 million pounds in the best years. Significant amounts were, and still are, produced for the local processing facilities, which include Marie Sharp's, Chilly Willy, and Hot Mamas. The labour-intensive crop employed a significant labour force. The benefits were direct for small-scale producers who often employed local labour in the communities involved. The commodity is not being exported at present, with regular production limited to approximately 30 acres to supply local processors. However, the commodity has great potential, because it can be produced by small-scale producers, has relatively low production costs compared to papayas, and is a short-term crop.

The two previous crops have benefited from their export potential but there is a third agricultural activity that also benefits directly from the prevention of pest damage to production. The citrus industry would be adversely affected due to fruit losses caused by the larvae of the Medfly. By extension, pest-free status also produces social benefits for this industry. Citrus fruits are produced mainly for processing and

very little production is exported, in part due to other phytosanitary restrictions against *Anastrepha* spp. However, pest-free status may still permit exports to countries that are also affected by *Anastrepha* spp, especially *A. ludens*.

The biggest social benefit for the citrus industry is the absence of insecticide use to control the pest, which means that workers are not exposed to those insecticides. The second point is that the industry does not have to divert labour to this aspect of management and workers can be directed to other useful production practices. The industry invariably suffers from a severe shortage of manual labour, especially for the harvesting of fruit, and the problem would be exacerbated if Medfly management were also required. It is estimated that citrus fruits would require large quantities of insecticide and bait application per year, which would translate into additional labourers, who would have to be drawn from the limited existing labour pool.

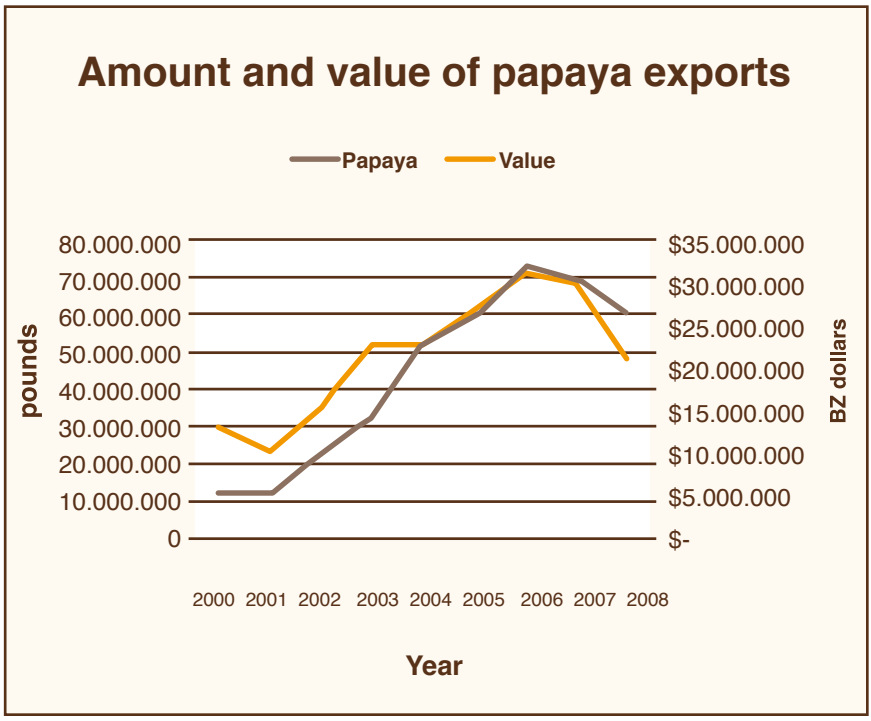
An overall, perhaps unquantifiable, social benefit is the availability of uninfected fruit for the population. Many tropical fruits are produced seasonally in Belize, and due to the wide array, one or more fruits are nearly always in season. The main fruits that would be affected by Medfly include citrus (orange, grapefruit, and tangerine), guava, mango, sapodilla, papaya, pepper, tomato, and melon, to mention but a few. These are produced mostly as backyard crops, especially in rural communities, and constitute an important part of the population's diet. In many cases, part of the production is commercialized locally and may also generate significant household income that can be used to purchase other food items.

4.2. Economic / Commercial

The papaya industry has been one of the direct beneficiaries of the existence of the Medfly programme, since Belize would be unable to export this commodity to the USA without it. The creation of employment and foreign exchange earnings are two significant benefits for a vibrant papaya industry.

Belize started producing and exporting small amounts of papayas as early as 1982, albeit on an irregular basis. This continued until 1989, when investments in the Cayo District at the time were lost after a Medfly outbreak in the Stann Creek District resulted in loss of market access. Following the establishment of the Comprehensive National Surveillance Programme in 1989, Medfly host commodities such as papaya could still be exported if the fields were located outside the area of the outbreak. At the time, Belize was able to export types of fresh produce that are Medfly hosts from four districts. While the papaya industry grew, investors still feared that the Medfly could pose a potential threat to the industry. Therefore, it was not until 2001, when the entire country of Belize was officially recognized by the USDA as Medfly free, that the papaya industry began to undergo exponential growth in terms of both the volume and value of exports (Figure 1). In 2000, approximately eleven million pounds of papaya, with an estimated value of BZ$12.7 million, were exported, compared to the sixty-one million pounds in 2008, worth an estimated BZ$21.3 million. This represents an increase of 454.5% and 70.8% in volume and value, respectively.

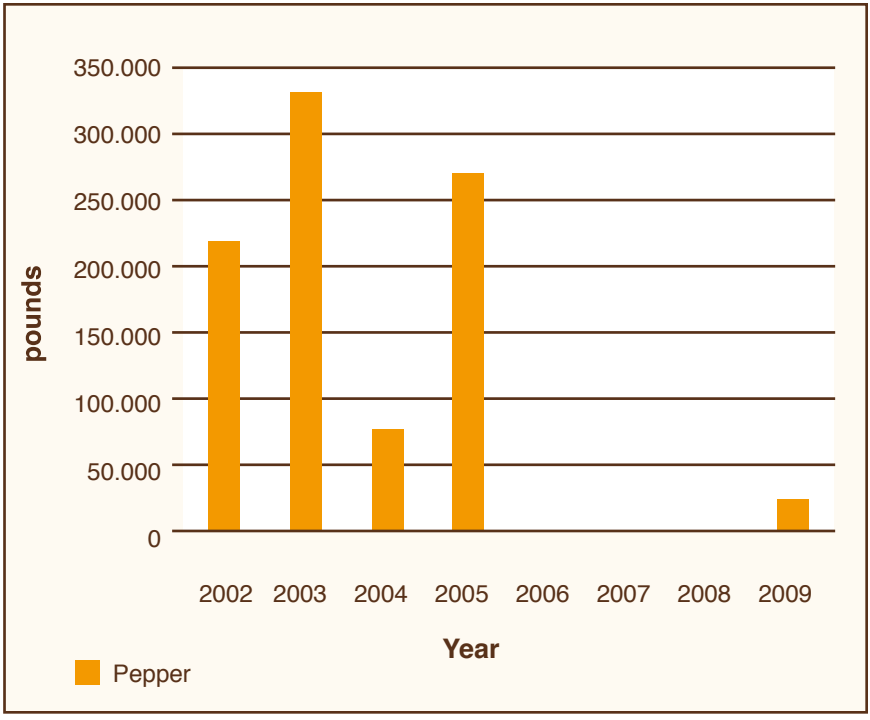
Figure 2



Source: Ministry of Agriculture; BAHA

In addition to papaya, habanero peppers were successfully exported under the export certification protocol (Figure 2). Due to challenges associated with marketing, rather than production or phytosanitary issues, this commodity has been exported on an irregular basis; however, it continues to have great potential as an export commodity.

Figure 3



Source: Ministry of Agriculture; BAHA

The Medfly programme currently costs BAHA roughly BZ$400,000.00 annually to implement. This does not include eradication costs, which can be as much as BZ$100,000.00 per outbreak. However, this is considered money well spent when we look at the benefits of the programme.

4.3. Others

An environmental benefit resulting from Belize's Medfly-free status is the non-application of insecticides, which have the disadvantage of leaving residues in food, soil and water. In addition, the prolonged and continuous use of pesticides often leads to pests developing resistance. It is estimated that if the Medfly became established in Belize, 138,000 litres of Malathion™, costing an estimated BZ$1,104,000.00 dollars, would be needed annually for eradication.

Whenever there are interceptions, GF120™ (spinosad) is the only environmentally safe insecticide applied for control purposes. Its efficacy is equivalent to that of Malathion™; however, it has the added benefit of not affecting bee populations. In addition, GF120™ poses little risk to the person applying the product.

5. DESCRIPTION OF THE PROBLEM

The Mediterranean fruit fly *Ceratitis capitata* (Wiedemann), or Medfly as it is commonly known, originated in sub-Saharan Africa. It ranks as one of the most destructive agricultural pests worldwide, due to the wide range of hosts that it affects and its ability to adapt to different climatic conditions, which is greater than that of other fruit fly species. Besides economic losses, crop damage caused by fruit flies limits the fruit available in backyards, which is an important source of nutrition for many in the population (T. Vo et al., 2001). The Medfly was first detected in the Americas in 1905, in Brazil, and subsequently moved north, infesting countries in Central America. By 1987, it had been reported in all the countries of Central America, including Belize, as well as Mexico and the United States.

Although a surveillance programme had existed in Belize since 1977, it was not until 1987 that the first Medfly was reported in Belize, in the Stann Creek District located in the south of the country. Since the existing initiative was not a systematic surveillance programme, authorities in the USA considered the entire country an infested area and all Medfly host commodities became ineligible for export to that country. These initiatives were strict quarantine approaches, primarily to prevent the introduction of the pest into parts of the USA and Mexico, and were in no way associated with the more recent concepts of pest-free areas, as

stipulated by the International Plant Protection Convention (IPPC Revised text 1997), or regionalization, pioneered by the Committee on Sanitary and Phytosanitary (SPS) Measures of the World Trade Organization (WTO). These latter concepts are related to trade and have a commercial connotation besides phytosanitary applicability. Thus, Belize's Medfly status started off as a strict quarantine approach whereby the country served as a barrier against the pest, and later evolved into the concept of regionalization to take commercial advantage of this status.

As a result, exports of papaya grown in the Cayo District - in the central region of the country, where there was no known occurrence of Medfly - were not admissible to the USA because of the lack of a comprehensive national surveillance programme. Considerable investments, totalling thousands of dollars, were lost, in addition to collateral losses such as employment and foreign exchange due to this Sanitary and Phytosanitary (SPS) issue. The decision by the USA to prohibit the import of Medfly host commodities from Belize alerted the Government of Belize to the damage that an exotic pest incursion could do to the national economy and prompted the Belize government to take decisive action to address the problem.

The incident highlighted how inadequate capacity to control plant pests could have devastating economic consequences. In addition, it presented an obstacle to the government's plan to promote diversification in non-traditional agricultural exports. With prices for traditional commodities in decline, diversification was seen as a way to generate jobs, reduce reliance on sugarcane, citrus fruits and bananas and generate much-needed foreign exchange. The Medfly outbreak showed how a change in phytosanitary status could easily disrupt such plans.

6. FORMULATION AND IMPLEMENTATION OF THE STRATEGY

In order to provide an adequate response to the problem caused by the Medfly outbreak in 1987, the Government of Belize, in collaboration with international partners such as the FAO and the USDA, resolved to act quickly and find a long-term solution. The first step was to establish a comprehensive surveillance programme, so that fresh fruit produced outside of infested areas could still be exported to the US.

The Comprehensive National Surveillance Programme was established in 1989 through a Technical Cooperation Programme (TCP) with the FAO. It built on activities to determine the presence/absence of Medfly that had been undertaken since 1977 under a Memorandum of Understanding between the USDA and the Government of Belize. The new programme consisted of three major components: surveillance, eradication and control and certification (the latter component specifically for export host commodities).

With the establishment of the BAHA in 2000, responsibilities for the programme were assigned to this Authority. BAHA further enhanced Belize's capacity to meet requirements for international trade and ensure safe agricultural products for domestic use. Created as a semi-autonomous, statutory body under the Ministry of Agriculture, Fisheries

and Cooperatives, with responsibility for food safety, animal and plant health and quarantine, BAHA is the first line of defence against foreign pests like the Medfly and diseases that could threaten animal, plant or human health and life.

Quarantine inspectors, stationed at all official points of entry, inspect luggage, vehicles, commodities and anything else via which pests or diseases could be introduced. Legislation forbids travellers entering Belize from bringing in fresh fruits, meats, plants, birds and plant and animal products without a valid BAHA import permit. BAHA's integrated approach to biosecurity was innovative at the time, and required substantial investments. By creating a one-stop shop for all inspection, quarantine and certification activities related to food safety and animal and plant health, public resources are used more effectively and results have improved. Today, BAHA is recognized as a leader in the application of SPS measures in Central America and the Caribbean.

7. CHARACTERISTICS OF THE SURVEILLANCE PROGRAMME

The Medfly surveillance programme consists of one coordinator and five Medfly technicians who are responsible for the daily trapping activities of the programme. The country is divided into six working areas, twenty-five trapping routes and approximately one thousand three hundred (1300) Medfly traps that are maintained and serviced throughout the year. The technicians are provided with adequate transportation (four-wheel drive vehicles) and trapping supplies to service between four and five trapping routes per week, with an average of two hundred and twenty five (225) traps per technician.

Trapping is conducted throughout the year in all districts of Belize. However, greater emphasis is placed on high-risk areas such as agricultural production areas, along major highways, the southern coastal ports, and residential areas that are more susceptible to infestations from this pest. This allows for the timely detection of any Medfly introduction and is crucial in containing the pest in order to implement eradication/ control measures.

Two main types of traps are used in the surveillance programme: the Jackson trap, which uses a synthetic para-pheromone lure that attracts

mostly males, and the Phase 4 trap, which uses a synthetic food lure. This synthetic food lure is more specific than the liquid protein baits, and is capable of detecting female medflies at lower populations than the male-specific attractant (International Atomic Energy Agency). In addition to the two regular traps, the programme also uses the C&C trap in high-risk areas. These traps utilize a 10-gram synthetic pheromone lure and are used effectively to monitor and detect very low Medfly population incursions (International Atomic Energy Agency). All these traps complement each other and strengthen the surveillance programme.

During the first 10 years of the programme, all the traps were serviced on a weekly basis. This changed in 1999, however, when a technical team from the International Regional Organization for Plant and Animal Health (OIRSA), the USDA/APHIS and the Ministry of Agriculture reviewed the program and recommended that traps in the northern part of the country be serviced on a bi-weekly basis, since all the detections had been found in the southern region of the country. This recommendation has since been implemented by BAHA. In addition, the Cayo working area that borders the Department of Peten in Guatemala conducts bi-weekly trapping from July to December (low-risk months) and weekly trapping from January to June (high -risk months). However, if there are any fertile captures in southern Belize, then the Cayo area is serviced weekly until all eradication measures have ended. The trapping routes are designed to cover all rural and urban areas accessible by four-wheel drive vehicles. Trapping is carried out on foot in hot spot areas such as the village of Placencia and for delimitation surveys.

8. CHARACTERISTICS OF THE ERADICATION PROGRAMME

The eradication programme consists of an Action Plan or Emergency Plan document that was developed with USDA's support using proven eradication protocols. This action plan is the guiding document on what, when, who and where activities are carried out whenever an eradication programme is implemented. Detection of a gravid female or multiple males triggers the action plan. Eradication activities are implemented in order to prevent the pest from moving into Medfly-free areas.

8.1. Fruit Stripping

All fruit trees that are Medfly hosts located within the delimited area are stripped of susceptible fruits, which are destroyed by an approved method such as burying or treatment with an insecticide. In the event of a Medfly being detected in commercial citrus orchards, there is a specific harvesting protocol with the Citrus Growers Association that guides this activity.

8.2. Chemical control

Chemical control using an environmentally friendly pesticide is conducted within the delimited area. Weekly ground spraying usually commences within 72 hours of the confirmation of the pest and lasts for at

least six weeks if there are no repeated detections. Since the inception of the programme, aerial application of chemicals has only been conducted once. All subsequent chemical application has been ground spraying with the use of all-terrain vehicles or backpack sprayers.

The only approved insecticide for use in the control of Medfly is GF120™ (spinosad) which is environmentally safe, can be applied efficiently using hand pumps, and has an efficacy equivalent to Malathion™.

8.3. Trap intensification

Intensified trapping is carried out in a delimited area of 25 km^2 where both female and male specific traps are deployed at a ratio of 1:1 in the delimited area. These traps remain in service for ninety days from the date of the last detection.

8.4. Internal Quarantine

Internal quarantine is established following the guidelines in the Emergency Plan. A gravid female or multiple males are thresholds that will trigger the establishment of internal quarantine. A strategic location is found (usually a bottleneck, in order to be able to control all traffic exiting the area under quarantine) and a 24-hour checkpoint is set up. All Medfly hosts are prohibited from leaving the area under quarantine and all persons and vehicles are checked for fruits. This checkpoint is lifted after 90 days of continuous trapping with no further detection.

8.5 .Quarantine System

The quarantine system comprises quarantine inspectors posted at all the official ports of entry into Belize, who control the import and export of all regulated agricultural products, including plants and plant products. The quarantine system serves as the first line of defence in the prevention and introduction of both plant and animal diseases. Regulations stipulated under the BAHA Act define the responsibilities and powers of these quarantine inspectors. Their defined duties include intercepting material of quarantine importance through the inspection of incoming luggage and cargo, and the inspection and certification of commercial shipments of agriculture produce and products, that is, fruits, vegetables, meat and their processed products for import and export purposes.

Under the auspices of the Modernization Project and with assistance from the USDA, the Medfly Programme was further strengthened with the establishment of quarantine stations in Placencia and Big Creek, two areas of high incidences of interception of medflies. Although no formal trade is established with Honduras and the south of Guatemala, the high frequency of transit of passengers from those two countries via those two entry points has been identified as one way in which the pest can be introduced into Belize. The strengthening of quarantine in those areas has led to timely detections and a swift response to eradicate outbreaks.

8.6. Certification Programme

The USDA/APHIS made certification programmes for Medfly host commodities a market requirement in the latter part of the 1990s, in

order to mitigate the risk of introduction of Medfly into the continental USA. An export protocol is the guiding document that clearly establishes the responsibilities of all the stakeholders. BAHA, as the regulatory agency, has to ensure that all phytosanitary requirements for export are met; this includes field certification to ensure that plants are free from pests, and certification at the packing facility. The latter activity includes inspection of at least 1% of packed commodities; however, around 10% is actually inspected. The grower and exporter has to sign a compliance agreement with BAHA and anyone who does not meet the requirements is suspended from exporting until remedial actions are taken and the problem corrected.

9. SUCCESS VARIABLES OF THE PROGRAMME

The Medfly programme has been highly effective and efficient over the last 30 years due to a number of variables. The primary reason for the success of this programme has been the highly motivated, committed and trained staff. Although small when compared to other programmes in the region, technicians are willing to assume additional responsibilities whenever the action plan is implemented, and therefore, the response time to implement eradication activities is very short. The fact that the Medfly has never become established in Belize is testament to this devotion.

Another variable that has led to the success for the programme has been the Government of Belize's visionary thinking when it established BAHA in 2000. This has allowed the Medfly programme to be coordinated by one agency responsible for all aspects of agricultural health. This means that resources from other departments can be called upon to assist in eradication activities. A good example is the use of quarantine inspectors to assist in manning the internal checkpoints. The Ministry of Agriculture continues to provide funding for the operational activities of the programme. A third variable that has led to the success of the Medfly programme has been the excellent collaboration and cooperation between Belize and the USDA. This collaboration has led to both technical and financial assistance from USDA that allows us to

implement new technologies and procedures in fruit fly control and benefit from experts in the region. The financial contribution of USDA to the Medfly programme in terms of vehicles, trapping materials and equipment, has been significant over the years.

Adequate legislation has given the Plant Health Officers the legal backing to be able to implement activities such as fruit stripping, chemical control, and the establishment of internal quarantine, with little problems with the public.

Industry has always recognized the importance of the programme. As a result, their support has been manifested in several ways, which include paying service fees, directly supporting eradication activities, and complying fully with certification requirements. BAHA has been able to demonstrate to the policy makers the tangible benefits derived from their investment in SPS.

10. FUTURE OF THE PROGRAMME

Over the years, the Medfly programme has developed into a highly efficient and effective initiative that has allowed Belize to maintain its Medfly-free status. However, the programme continues to evolve and implement new technologies and procedures as they become available in order to maintain its efficiency. With the introduction of new technologies, such as the Geographic Information System, the programme is now able to make informed decisions based on historical data, run queries to look at trends, and implement corrective actions to increase the efficiency of the programme.

Belize is now an integral part of the MOSCAMED programme and participates in technical meetings and benefits from the technical resources of this regional initiative. The next step is to sign a cooperative agreement with USDA to formalize the relationship between the two agencies.

Belize has yet to make the most of the comparative advantage that it enjoys over the rest of the region. Its Medfly-free status allows it to produce and export from anywhere in the country and its proximity to markets in the USA (two hours by air) means that produce can be harvested and exported at a more mature stage, which increases quality and price. The Government of Belize continues to invest and encourage diversification; therefore, the challenge will be for producers and exporters to organize and take advantage of this opportunity.

11. CONCLUSION

Historical data verify that the Mediterranean fruit fly has never become established in Belize despite the sporadic outbreaks since 1987. The outbreaks have all occurred in the south of the country and may be due to unverified factors, such as immigrant labour in the two major agricultural sectors or whenever the wild Medfly populations in Guatemala and Honduras are at their highest. Effective surveillance and certification activities have enabled papaya and other horticulture exports to enter the USA, even when outbreaks of Medfly have occurred. The USDA's official recognition of Belize as a Medfly-free area on August 28, 2001 is testament to the fact that Medfly is not endemic to Belize.

Based on the success with papaya and hot peppers, efforts are underway to develop and export new commodities like guava and pitahaya. The experience in Belize illustrates the advantages that can accrue to countries that take steps to address SPS issues to meet international requirements for trade.

While the Medfly programme has been a success, it has not been without challenges. Establishing and maintaining pest-free areas is costly and requires government commitment to providing timely and adequate resources. The benefits of pest-free areas are better maximized with market access and exports of host commodities.

BAHA has repeatedly demonstrated its efficiency and capability in controlling and eradicating all Medfly outbreaks. The Government of Belize still considers the detection and eradication of the Mediterranean fruit fly a high priority. As a result, it remains committed to investing in capacity building to maintain a highly trained, well-equipped and dedicated staff.

12. REFERENCES

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