May 2002

IICA

CARAPHIN news

Number 22

ISSN 1018-1210

Newsletter of the Caribbean Animal and Plant Health Information Network

THE STATUS OF BLACK SIGATOKA DISEASE IN JAMAICA

In recent years, there has been a consistent decline in export acreage and volumes of banana, as a result of climatic and international market forces. Export banana production in Jamaica achieved its highest annual levels of 105,000 export tonnes in the 1970s. In 1996, 87,000 tonnes were exported and 80,000 tonnes were consumed locally, all from 5,000 hectares. Total exports for the year 2000 were 42,000 tonnes. Recently, there has been an increasingly vibrant domestic market estimated conservatively at 92,000 tonnes in the year 2000. Ironically however, dedicated domestic banana acreages have been virtually abandoned, since the complete establishment of the fungal leaf spot disease Black Sigatoka (*Mycosphaerella fijiensis*) in all areas of Jamaica over the last 5 years.

The total of 132,000 tonnes produced in Jamaica during the year 2000 was cultivated on the 3000 hectares registered for export production. The relative increase in productivity by 10.6 tonnes per hectare per year, was achieved as a result of a very successful Black Sigatoka disease management programme, with financial assistance from the European Union. The programme started prior to the first diagnosis of the disease in north-eastern Jamaica in August 1995.

After the outbreak, appropriate preplanned strategies for containment and management, were put into action. The programme took into consideration medium to low levels of technology, crop nutrition and educational background on many small farms; uneven topography (cultivations on hillsides and deep closed valleys) non-contiguous banana acreages and the proliferation of abandoned cultivations.

IICA Black Sigatoka Workshop in Jamaica. (Inset, Symptoms of Black Sigatoka).

Management of Black Sigatoka in Jamaica

From 1989 to 1992, Jamaica embarked upon a programme of preparedness for the inevitable outbreak of Black Sigotaka. All aspects of the management of Black Sigatoka were studied in detail. A multi-site, on-farm project was initiated to adapt the biological and climatic forecasting methods for the prediction of disease outbreaks and to progressively measure disease intensity. In 1992 to 1993, an island-wide series of seminars and workshops was carried out. Relevant technical personnel were targeted from all agricultural divisions for sensitisation regarding:

(a) the effect of Black Sigatoka
(b) the means of entry into the island and mechanisms of spread
(c) methods of disease containment and quarantine
(d) diagnosis of Black Sigatoka in the field and the differentiation between Black & Yellow Sigatoka disease symptoms; and
(e) management strategies for Black Sigatoka

The programmes were broadcast nationally through print, radio and television media. A manual on "Sigatoka Disease Control" was prepared, updated in 2000 and circulated to all extension officers. A policy decision was made that all new national banana production expansion or development programmes were mandated to have a centrally managed Sigatoka Disease Management Unit (DMU). The DMU had been a very successful component of a development programme in western Jamaica WESTBAN (1994 - 1999) and continues to be an important component of the current European Union Banana Support Programme (EUBSP) since 1996. In addition to technical advisors and farmer training for cultural and chemical Sigatoka disease control, the DMU conducts spray-

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Status of Black Sigatoka continued

ing using highly scientific techniques, certified ground spray teams and a guaranteed supply of chemical inputs. A continuous supply of leaf spot control chemicals and all other inputs necessary for optimum crop nutrition and cultural practices that impact upon the intensity of the disease, were also acquired, guaranteed and made available to farmers. Currently, a credit scheme for inputs is operated by the Banana Trading Company (BTC), which is subsidiary of the Banana Export Company (BECO).

Disease Management Strategies Used in Jamaica

The rigid chemical management strategy used for the more virulent Black Sigatoka requires more frequent applications of fungicides than for Yellow Sigatoka.

Before 1995, the number of applications to control Yellow Sigatoka ranged from 12-22, for Black Sigatoka application have been reduced from 29 to between 18-26 in various locations according to rainfall and evaporation levels.

The number and frequency of fungicide applications are further reduced significantly in areas of low to medium rainfall levels and when climatic and biological disease forecasting strategies are utilised.

Current Research Efforts in Black Sigatoka Management

The monitoring of the national Sigatoka disease programme is one of the primary functions of the research development. Fungicide sensitivity monitoring of *Mycosphaerella fijiensis* is carried out for specific reference areas across the island. The fungicides (propiconazole, benomyl, azoxystrobin and tridemorph) are tested periodically. The Research Department formulates appropriate chemical strategies for all export farms and especially those with peculiar disease problems. Each year, at least one Sigatoka fungicide trial has been carried out. Products found suitable are incorporated into the management programme whenever they are made available to the local industry. Training of new extension officers and periodic re-training of DMU technicians, data collectors and farm supervisors, is on farms to ensure good agricultural practices are carried out by the Research Department. This facilitates the monitoring of disease control and complimentary cultural practices on individual farms.

Host Plant Resistance

Among the disease management technologies, improved cultivars with high levels of resistance or tolerance to Sigatoka disease offer solutions for the guarantee of a domestic market supply. Resistant varieties

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LA SIGATOKA NOIRE EN JAMAÏQUE

La manifestation de la Sigatoka noire depuis 1995 a entraîné la décimation d'hectares réservés à la culture de la banane locale ainsi que le déclin de la production de la banane jaune. Cependant, la mise en œuvre réussie d'un programme de luttes intégrées (PIGM) a contribué à améliorer la productivité du secteur de la banane. Par conséquent, la production destinée à l'exportation a pu contribuer exclusivement à la consommation locale de bananes dans un contexte où la production destinée à l'exportation est de moins en moins importante. Le programme courant de gestion des maladies a été préempté par une préparation et une planification minutieuse préalable à la première manifestation en 1995. Le PIGM en cours consiste en services d'aide sur le terrain, qui sont coordonnés en une seule unité de gestion des maladies (UGM); ces services mettent en place les stratégies chimiques appropriées afin de garantir l'efficacité, prévenir toute résistance au fongicide et utilisent à cet effet des méthodes de prévisions biologiques et climatiques, ceci avec de bonnes pratiques culturales. La recherche bénéficie également d'un programme de surveillance de la sensibilité des fongicides; un programme de certification des exploitations; d'études efficaces de nouveaux fongicides; de la formation dans le cadre de l'UGM ainsi que de d'officiers sur le terrain et de la formulation de stratégies appropriées pour les fongicides. L'utilisation de variétés résistantes ainsi que les facteurs qui influencent le contrôle de la maladie à l'avenir font également l'objet de discussions.

SIGATOKA NEGRA EN JAMAICA

La epidemia de Sigatoka Negra en Jamaica desde 1995 ha resultado en el diezmamiento de la superficie que fuera dedicada al comercio local de bananas y a la reducción de la producción de plátano. Sin embargo, la exitosa implementación del programa sobre el manejo integrado de la enfermedades (IDMP) ha contribuido a un mejoramiento general en la productividad de bananas. Como resultado, la producción para la exportación ha podido cubrir exclusivamente el creciente consumo local de bananas en un clima de disminución de la producción para la exportación. El presente programa de manejo de enfermedades fue precedido por una preparación y planificación cuidadosa antes de la primera epidemia en 1995. El presente IDMP consiste en servicios de apoyo de campo, que operan en una unidad central de manejo de enfermedades (DMU); implementan adecuadas estrategias químicas para garantizar la eficacia y prevenir la resistencia fungicida y el uso de métodos de pronóstico climático y biológico con buenas prácticas culturales. Se proporciona el apoyo de investigación en forma de un programa de monitoreo de sensibilidad fungicida; un programa de certificación de fincas; estudios de eficacia de nuevos fungicidas; entrenamiento para los DMU y los oficiales de extensión y la formulación de estrategias fungicidas adecuadas. El uso de variedades resistentes y los factores que influyan en el control de la enfermedad en el futuro también se plantean.

Status of Black Sigatoka cont'd

will become more necessary for local consumption and the by-products trade in Jamaica when there is no support from export production.

Preliminary evaluations of cultivars from Jamaica, FHIA and IITA programme were started in Jamaica in 1996. A new small-farm programme (2002), to supply plantains mainly for the export and chips trade, is currently being initiated with support from the EU. That development project is being complimented by a new regional research project, funded by the OAS in collaboration with CABI. The aim of the latter is to evaluate non-resistant and resistant plantain varieties in an integrated pest management programme.

The Future of Bananas and Sigatoka Management

The local and export market for Jamaican bananas continue to express a definite preference for Cavendish cultivars. As long as these susceptible varieties are produced, a costly but effective Sigatoka disease control programme will remain critical to the supply of this traditional carbohydrate food source. However, production of resistant varieties will become necessary if or when resources are no longer available to control the disease economically. Many believe this scenario is imminent for Caribbean territories and other ACP nations, as a result of globalisation. Therefore, it is necessary to embark upon or continue programmes to breed, evaluate, multiply and distribute resistant or more tolerant cultivars. Some varieties are currently available as a result of international research programmes utilising biotechnology of both conventional breeding and genetic engineering method. However, the local and overseas markets and consumer standards of acceptability will have to be modified in order to accommodate the peculiarities of genetic origin and composition or post-harvest fruit quality of the new varieties.

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TWO VIRAL ISOLATES OF *CAPSICUM CHINENSIS* IN TRINIDAD AND TOBAGO

Viruses are limiting factors to hot pepper (*Capsicum chinensis*) production in Trinidad and Tobago. They occur in single or mixed infections, and are the most ubiquitous pathogens found in hot pepper fields throughout Trinidad and Tobago. Research in Trinidad has demonstrated that viruses are spread by aphids, white flies and mechanical means. Hot pepper is widely cultivated in Trinidad and Tobago and there is an expanding export potential for this crop. Although the average value for each year of hot pepper exported from Trinidad for the period 1995 to 2000 is TT$6.3 million, viral diseases have caused considerable economic losses in hot pepper through yield reduction and poor quality. Information on the properties of viruses of hot pepper in Trinidad and Tobago is lacking, however, Umaharan *et al* (1999) reported on the identification and diversity of geminiviruses of selected weeds and crops, including hot pepper, in Trinidad and Tobago. There is a need to conduct etiological studies of viruses infecting hot pepper in Trinidad and Tobago. Such studies are critical for the development of an integrated crop management program.

Several isolates were screened for their effect on the growth and yield of hot pepper. These isolates were collected from hot pepper fields throughout Trinidad and were maintained separately in several plants of a local hot pepper selection. Two isolates were selected for further study based upon their reactions with pepper cultivars. Isolate 1 induced severe mosaic, stunting, distortion of fruit, and reduced fruit size, while isolate 2 induced mild to moderate symptoms on local hot pepper.

Several tests including host indicator tests, viral inclusions, vector transmission, and enzyme-linked immunosorbent assay (ELISA) were conducted in an effort to characterize these isolates. In viral inclusion tests, cylindrical inclusions indicating the presence of potyvirus were observed in leaf samples of local hot pepper plants infected with isolates 1 and 2. Preliminary studies of samples collected from selected fields also revealed the presence of cylindrical inclusions, which are characteristic of Potyviruses.

Viral isolates 1 and 2, which were maintained separately in local hot pepper, were transmitted by aphids to healthy hot pepper seedlings. The presence of isolates 1 and 2 was confirmed in host indicator plants by ELISA and by back-inoculation to a susceptible local selection of hot pepper or the cultivar 'West-Indian Yellow'.

Samples of test plants infected with isolates 1 or 2 reacted positively on ELISA with a universal antiserum developed to detect Potyviruses. Plant samples were collected from surveys of hot pepper fields throughout Trinidad, and ELISA tests were carried out to detect the presence of viruses. Potato virus Y (PVY), a universal antiserum to Potyviruses, Tomato mosaic virus (TMV) and Cucumber mosaic virus (CMV), Potyvirus, and Geminivirus were detected in field samples. Results from ELISA of samples collected from these surveys indicated that Potyviruses were the most common of the virsuses detected in hot pepper fields. Mixed infections of potyviruses with CMV and/or Geminiviruses were also detected, however, Geminiviruses were only detected in a few fields.

Viral Mosaic of hot pepper

The results obtained from host indicator studies, virus inclusions, aphid transmission, and ELISA, revealed that the properties of viral isolate 1 and 2 were consistent with those viruses belonging to the potyvirus group. It is of interest to note that the pepper cultivar 'King Arthur' and the cultivar 'California Wonder VR2'

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Viral isolates of Capsicum chinensis *cont'd*

DEUX MALADIES CONTAGIEUSES VIRALES DU CAPSICUM CHINENSIS À TRINIDAD ET TOBAGO

L'importance de ces maladies virales du *Capsicum chinensis*, piment fort fait l'objet de discussions. Des études étiologiques préliminaires sur deux maladies virales du piment fort ont été signalées. Les cultivars de piments, les sélections et les lignes provenant du Centre asiatique de développement et de Recherche sur les Légumes (AVDRC), ainsi que les sélections issues de : l'Organisation des Nations Unies pour l'alimentation et l'agriculture (FAO), la région Caraïbe, et Trinidad ont été exposées aux maladies virales du piment fort. Une analyse Méthodes immuno-enzymatiques (ELISA) ont été utilisée dans le cadre de la détection dans les échantillons de piments, du Virus de la pomme de terre Y (PVY), du Virus de la mosaïque du concombre (RMV), du virus de la mosaïque de la tomate (RMV), du potyvirus et des geminivirus. Les deux maladies du piment ont réagi à l'ELISA avec un antisérum universel qui a été produit pour lutter contre les potyvirus. Des possibilités de gestion de maladies virales basées sur les résultats de ces études étiologiques initiales relatives à ces maladies contagieuses sont à finaliser.

DOS AISLADOS VIRALES DE CAPSICUM CHINENSIS EN TRINIDAD Y TOBAGO

Se plantea la importancia de enfermedades virales de Capsicum chinensis, chile picante. Se reportan los estudios aetilógicos preliminares sobre dos aislados virales del chile picante. Los cultivos de chiles, las selecciones y las líneas obtenidas del Centro Asiático de Desarrollo e Investigación de Vegetales. (AVDRC), y las selecciones de los siguientes: La Organización para la Alimentación y la Agricultura (FAO), La Región del Caribe y Trinidad se encontraron todas susceptibles a los dos aislados virales del chile picante. Se usó el ensaye immunoabsorbente vinculada a la enzima (ELISA) para detectar en muestras de chile picante el virus de Papa Y (PVY), el Virus de Mosaico de Pepino (CMV), el Virus de Mosaico de Tomate (RMV), potyvirus y geminivirus. Los dos aislados del chile picante reaccionaron en ELISA con un antiserum universal, que fue producido contra los potyvirus. Se plantean los enfoques al manejo de enfermedades virales basados sobre los resultados de estos estudios aetiológicos iniciales sobre estos aislados virales.

which have been reported to be resistant to strains of Potato virus Y (PVY) were susceptible to viral isolates l and 2 in this study. It appears that all hot pepper cultivars currently used for commercial production in Trinidad and Tobago are susceptible to these two viral isolates 1 and 2 used in this study. There is a need to source and identify resistance to these isolates of hot pepper because of the significant effect they have on yield reduction and fruit quality.

Varied degrees of viral disease tolerance have been observed among the hot pepper cultivars and selections commercially cultivated in Trinidad. The hot pepper selections 'West-Indian Red', and 'Lantern' have shown field tolerance to the viruses when cultivated at various locations in Trinidad and Tobago. However, severe mottling, stunting, reduced fruit size and fruit distortion were induced when seedlings of these cultivars were inoculated with isolate 1 under greenhouse conditions. Viral isolates inducing similar symptoms to those induced by isolate 1 were found in several hot pepper growing areas of Trinidad, indicating that other virulent isolates exist in several areas where hot pepper is cultivated. The hot pepper selection, 'Faria', is highly susceptible to viral isolate 1 - however, it is widely cultivated by growers in Trinidad because of its desirability for the export trade. In the field situation, 'Faria' has been shown to be tolerant to viruses and viral complexes and performs very well with respect to yield when cultivated in certain locations in Trinidad, while in other areas it is highly susceptibly to the viruses present. Subsequent cultivation in these same areas has caused growers to discontinue production because of low yields due to viral diseases.

This situation is probably due to increased viral disease pressure and/or breakdown in plant disease resistance. Another cultivar, 'West-Indian Yellow', which is not as popular as 'West-Indian Red', is very susceptible to viral isolates 1 and 2. From field surveys and greenhouse studies West-Indian Yellow has been observed to be more susceptible than the selections of hot pepper with fruits that are red in colour when ripe. Growers have experienced difficulties in sustained production of selections of hot pepper with fruits that are yellow in colour when ripe, mainly due to the deleterious effect of viral infection. These findings will have implications in the development of crop management strategies for viral diseases of hot pepper in Trinidad and Tobago.

An integrated crop management (ICM) program is being recommended for the control of viral diseases of hot pepper. This program includes the selection of virus tolerant varieties and the use of healthy seedlings from a reputable nursery producer. Routine field inspection for symptoms induced by viruses and other pests of hot pepper should be conducted. A continuous supply of nutrients and good soil and water management are pre-requisites for the successful cultivation of hot pepper. It is important to boost the nutrient status of virus-infected plants as soon as symptoms appear and maintain a balanced nutrient supply thereafter. In addition, the judicious use of pesticides to manage vectors and other pests of hot pepper is crucial for the success of such a program.

Conferring of resistance through genetic engineering has been successfully accomplished for several crops. Development of resistance against viruses and viral complexes of hot pepper through genetic engineering, using transgenic plants, needs to be pursued.

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SURVEY OF CITRUS LEAFMINER AND ITS NATURAL ENEMIES IN TRINIDAD

ENQUÊTE SUR LA MINEUSE DES FEUILLES DE CITRUS ET SES ENEMIS NATURELS À TRINIDAD

Une enquête dans des exploitations d'agrumes à été menée à Trinidad en Février 2002 et 2001 afin de déterminer les degrés d'infestation de la mineuse des feuilles de citrus et la présence d'ennemis naturels. Les résultats de l'enquête ont indiqué que 90% et 98% des échantillons étaient infestés avec l'insecte en 2000 et en 2001. Dans les communes de St. Andrew / St. David, Caroni et de St Patrick une augmentation de l'infestation a été remarquée. Celle-ci est passée d'infime en 2000 à modérée en 2001, alors que dans la commune de Victoria, le degré d'infestation de l'insecte est passé de modéré à peu important de 2000 à 2001. Les degrés d'infestation du moucheron étaient modérés en 2000 et 2001 pour les communes telles St. George et Navira/Mayaro.

Deux guêpes appartenant à la famille de la Mymaridae ont été recouvrées à partir de nymphes du moucheron incubées dans un laboratoire.

ESTUDIO DEL MINADOR DE HOJAS DE LOS CITRICIOS Y SUS ENEMIGOS NATURALES EN TRINIDAD

Se llevó a cabo un estudio en las fincas de cítricos de Trinidad en febrero de 2000 y 2001 con el fin de determinar los niveles de infestación de los minadores de hojas de cítricos Phyllocnistus citrella stainton (CLM) y la presencia de sus enemigos naturales. El resultado del estudio indicó que 90% y 98% de las fincas estudiadas estaban infestadas con CLM en 2000 y 2001 respectivamente. En los condados de St. Andrew/St. David, Caroni y St. Patrick había un incremento del nivel de infestación de CLM desde un nivel bajo en 2000 a moderado en 2001 mientras que en el condado de Victoria, los niveles de infestación disminuyeron de moderado en 2000 a bajo en 2001. Los niveles de infestación fueron moderados en 2000 y 2001 para los condados de St. George y Nariva/Mayaro.

Dos avisperos pertenecientes a la familia Mymaridae fueron desarrollados en el laboratorio desde la pupa CLM incubada.

Citrus leafminer (CLM), *Phyllocnistis citrella* Stainton, is native to South East Asia. From this region, the pest has spread to most citrus growing areas of the world. In the Western Hemisphere it was reported in Florida in 1993. It has since spread to Central America, South America and other Caribbean islands and invaded Trinidad in 1997 and Dominica in 1999. CLM is considered to be a serious pest of *Citrus spp*. and other members of Rutaceae family and is especially important in the citrus nurseries in Trinidad. Economic damage results from the loss of the photosynthetic area caused by the mining of the larvae while old mines also serve to harbour secondary pests.

The Ministry of Agriculture, Land and Marine Resources, Trinidad conducted island-wide surveys in 2000 and 2001 to determine the distribution and level of infestation of CLM in Trinidad, to provide baseline data as a reference point for future studies, to determine the presence of indigenous natural enemies and to provide additional data, which would assist and inform decisions regarding long term management of the pest.

The island-wide surveys were conducted during in February 2000 and 2001 and were addressed at the commercial farm level. For these surveys a list of 300 'active' citrus farms was used to select 98 (33%) farms. Farms were divided into two strata via a stratified sampling procedure, based on farm size and county. In the first stratum, which consisted of 51 farms with greater than 3 ha, 66% (34 farms) were randomly selected for the survey. In the remaining stratum, which consisted of 247 farms with less than 3 ha, a 26% sample (64 farms) was taken using a systematic random sampling procedure.

Citrus Leafminer pupae on leaf

At each farm general on-farm information was collected which included farm location, citrus variety grown and farm size. The number of trees, shoots and leaves sampled and the number of trees, shoots and leaves infested with CLM were recorded. The presence of eggs, larvae, pupae and mines were also recorded. In the field also, three leaf samples were removed from each of the two terminal shoots on each tree at surveyed sites and carried to the laboratory for more detailed observations.

In the laboratory, samples were examined under a binocular microscope (40x). Counts of the following observations were recorded for each leaf: presence of mines, presence of vacated mines, number of eggs, larvae, pupae and adults, presence of parasitoids in mines. Leaves with unhatched pupae were placed in glass jars and covered with black cloth and incubated. Jars were examined every 3 days over a period of 15 days for emergence of natural enemies.

Data was analyzed using the SPSS statistical package. The percentage of trees, shoots and leaves infested with CLM and the mean number of mines, larva and pupa were used in rating CLM infestation levels of zero, low, moderate, high infestation and extremely high. Adult CLM numbers were not used in rating infestation levels, since only one adult CLM was recovered.

Findings from the island-wide survey on CLM for 2000 - 2001 are listed in Table I.

The data indicates that there was an increased incidence of Citrus leafminer (CLM) in citrus orchards. It seems that CLM may be emerging as the pest of economic importance to the citrus industry. It be should noted however, that the CLM and Citrus Blackfly were present in citrus fields

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Survey of Citrus Leafminer cont'd

at the same time, and it is possible that the severity of CLM incidence may have been masked by the occurrence of CBF. The increased incidence of CLM can therefore be attributed to the following (1) As CBF levels are declining the presence of CLM incidence maybe becoming more obvious (2) actual increases in CLM levels. Since CLM is now widespread, steps should be taken to effectively manage this pest.

In countries throughout the world, eradication of Citrus Leafminer has been unsuccessful. However, effective control has been achieved using an integrated pest management approach. In Trinidad, CLM is being managed at present in nurseries using the insecticide imidacloprid. Under field conditions no control measures have been implemented to date. In Florida, chemical control of citrus leafminer has been applied. However, it was noted that control, using insecticides is difficult since the larvae are protected within the leaf. It might be possible to control CLM by spraying young undifferentiated flushes as a preventive measure. Accurate timing of spray application and monitoring of citrus trees is essential for effective control. Semi-chemical trapping using pheromones is also an option for controlling CLM populations.

Heppner (1993) and Knapp et al (1995) have indicated that biological control using parasites, seem to be the most likely measure in reducing CLM levels in the long-run.

For Trinidad an integrated pest management approach might be the best option. This approach will focus on classical biological control. Bioprospecting for the presence and effect of indigenous natural enemies is therefore necessary before a decision is made to utilize exotic natural enemies for controlling the pest.

Table I.

Country	Number of farms infested		Level of infestation	
	2000	2001	2000	2001
St. Andrew/St. David (12*)	10	12	Low	Moderate
St. George (12*)	11	12	Moderate	Moderate
Caroni (19*)	18	19	Low	Moderate
St. Patrick (30*)	23	28	Low	Moderate
Victoria ( )	-	-	Moderate	Low
Nariva/Mayaro(14*)	12	14	Moderate	Moderate

** No. of farms visited*

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PEST RISK ANALYSIS: AN ALTERNATIVE FOR METHYL BROMIDE

Methyl bromide fumigation is unquestionably the most widely used phytosanitary treatment in the world. However, it will be unavailable in the near future, being identified as an ozone depleting substance under the Montreal Protocol. The Montreal Protocol calls for the complete phase-out of methyl bromide production by 2005.

Even before the Montreal Protocol cast methyl bromide as an enemy of the ozone, researchers and regulators were actively searching for alternatives as chemical treatments were viewed as serious threats to health and the environment.

The loss of ethylene dibromide (EDB) was one of the first wake-up calls to those who were accustomed to relying on chemical treatments for regulatory purposes. The phytosanitary community, in particular, experienced serious short-term effects from the loss of EDB as treatments that had been the basis for authorizing the movement of several important commodities were revoked and many commodities reverted to prohibited status.

On the positive side, the loss of EDB spurred greater research into other forms of treatment, particularly physical treatments such as hot water, hot air, cold and controlled atmosphere, as well as combination treatments and systems approached. But at the same time, EDB's demise also caused greater immediate reliance on methyl bromide for plant quarantine treatments although it was clear that the future of methyl bromide and other chemical treatments was generally less secure.

The call for alternatives to methyl bromide has been ongoing and progress has been reported. What is increasingly apparent from these efforts is that no single alternative will replace methyl bromide. Instead, a range of options is developing with applications, which may be considered individually, in combination, or in systems to replace the one size fits all approached for which methyl bromide was so well suited.

Without methyl bromide the emerging situation involves a higher degree of precision and analysis to evaluate the efficacy and feasibility of different options. Relatively recent status given to international principles of trade demand that the strength of phytosanitary measures have a rational relationship with pest risk. This means that not only are options evaluated for the efficacy and feasibility, but also for their appropriateness in terms of the pest risk.

Principles of the International Plant Protection Convention (IPPC) and the World Trade Organization Agreement on the Application of Sanitary and Phytosanitary Measures place disciplines on regulatory decision making that strongly affect pest risk management choices, including the choice of treatments. Indeed, the concepts of appropriate level of protection and consistency in particular create fundamental problems where treatments such as methyl bromide are concerned. This is because methyl bromide's wide spectrum applicability, high efficacy, generally low phytotoxicity and low cost allowed for much less precise treatment prescriptions that were generally accepted.

In addition, there is increasing recognition of the principle of equivalency as countries search for ways and means to increase and diversify their market access. Traditionally, phytosanitary entry requirements have been extremely prescriptive,

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Pest Risk Analysis cont'd

ANALYSE DU RISQUE PHYTOSANITAIRE: UNE ALTERNATIVE AU BROMURE DE MÉTHYL

Le méthyle bromique a été mentionné en tant que traitement de quarantaine. Son remplacement par d'autres formes de traitement a été suggéré notamment par l'analyse du risque phytosanitaire comme étant un élément clé approprié, étant donnés les règlements prévus et les nouveaux principes liés au commerce international.

ANÁLISIS DE RIESGO DE PLAGA: UNA ALTERNATIVA PARA EL BROMURO DE METILO

Se destaca el uso de Bromuro de Metilo como tratamiento para cuarentena. Su reemplazo y la solicitud para una forma alternativa de tratamiento ha sido sugerida con el Análisis del Riesgo de Plagas siendo un elemento clave como un adecuada alternativa, dadas estas regulaciones prescriptivas y los nuevos principios relacionados al comercio internacional.

i.e. methyl bromide fumigation at some dose/time/temperature. It is now recognized that such prescriptions should translate to a level of protection believed to be appropriate for the importing country. Where a country can demonstrate that another pest management regime achieves the same level of protection, the importing country must consider this alternative regime. As countries begin to look critically at the level of protection being provided by various methyl bromide treatments, they are realizing that in many cases the level of protection is difficult to justify, and nearly always variable. This is because the traditional measurement for efficacy is based on the number of pests killed rather than the number of survivors. The result is that countries quickly bring into question the risk-basis for the strength of measures provided by certain treatments and they expose the inconsistency in levels of protection - clear infractions to international obligations under the IPPC and the SPS Agreement. The way forward from this situation involves the elements of standards and risk analysis.

It is important to realize that prescriptive regulations focus on the process rather than the desired outcome. That is to say that most phytosanitary regulations describe what must be done and do not explicitly describe the level of phytosanitary security that is required. Regulations designed around standards provide a more convenient and appropriate approach to accommodate various risk management regimes that achieve the desired end result instead of prescribing a specific process. Difficulties arise from defining and describing exactly what end result is desired. The issue is one of feasibility and perhaps resources rather than a question regarding the validity of the principles that provide the basis for such change.

Risk analysis raises different issues. At some point after it has been determined that a pest risk is unacceptable and requires risk management, an evaluation of risk management options is undertaken. It is at this point that some desired level of protection is considered, whether quantitative and explicit or qualitative and perhaps intuitive.

The principles of international trade tell us that zero-risk is not an option. Instead, we are concerned with managing risk for an appropriate level of protection. Where treatments such as methyl bromide fumigations are concerned, this means we need to know the efficacy of the treatment as a function of the pest risk, i.e., we want to know about the surviving pests rather than the dead pests. This involves a level of data collection and analysis that is somewhat greater than what is required to simply demonstrate mortality.

In most cases, the level of protection provided by methyl bromide treatments far exceed reasonable bounds for protection - extreme overkill that is difficult to justify. On the other hand there are also likely to be a few instances where regulators may question whether they are really achieving adequate protection. This may be the case where there is a high potential infestation rate. But in nearly all cases, what is most apparent is that the level of risk being managed is inconsistent - not corresponding to a particular level or range for protection. Further, there is the potential to identify situations where an alternative treatment may provide the necessary phytosanitary security. In some cases, it may even be found that treatment was not necessary in the first place because the prevalence of the pest, combined with the risk mitigation procedures that are in place, already achieve the desired level of phytosanitary security.

So perhaps the impending loss of methyl bromide and the parallel acceptance and application of international principles for trade lead us to the same point: a more realistic view of the role of treatments as tools for risk management especially in the case of methyl bromide where we desperately need alternatives. It is in this contemporary scenario that we find the role of risk analysis highlighted as the technical bridge linking pest risk to the strength of measures. As we determine that risks are not as we might have assumed, we find that alternatives to methyl bromide suddenly become more feasible.

If risk analysis is not an alternative to methyl bromide, it is indeed a key element in determining appropriate alternative measures.

Robert Griffin
Coordinator, International Plant Protection Convention Secretariat
FAO

Source: Proceedings of the NAPPO Workshop on Phytosanitary Alternatives to Methyl Bromide


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CASSAVA VIRUS X, FROG SKIN DISEASE - VENEZUELA

Frog Skin disease (FSD) is a disease of clonally propagated cassava (Manihot esculenta Crantz) and has been reported to reduce cassava yields significantly in South America. It is caused by an uncharacterized virus that is restricted to South America.

The evidence indicates that FSD is transmitted by stem cuttings and grafts, but little information is available on its distribution and incidence in Venezuela. Eighty-seven (87) tissue samples from plants expressing virus-like symptoms were collected from the states of Amazonas, Aragua , Barinas, Cojedes, Monagas, and Portuguesa. The average daytime temperature was 26 degrees C, but was higher (above 28 degrees C) during the dry season. Samples were collected during the cooler rainy season because such conditions tended to favor symptom development.

Roots of sampled cassava plants were examined for the presence of FSD. A single stem cutting 70-80 cm long was taken from each plant and subdivided into 4 pieces. Two (2) pieces were used as rootstocks in graft inoculation tests with Secundina scions for FSD detection, and 2 pieces were potted in sterilized soil to be used in other tests. All potted and grafted plants were kept in the Vegetable Virology Laboratory of the Faculty of Agronomy (Universidad Central de Venezuela), at an average temperature of 24 degrees C and 80 per cent relative humidity.

FSD infected plants were identified by mosaic signs on Secundina scions and the presence of 80 nm spherical viral particles. Most FSD infected cultivars expressed only root signs. In the case of Secundina cvs. MCOL 22 and MCOL 113, however, foliar symptoms were also detected. FSD was found in a simple infection in 1 cassava sample from Aragua State (14.3 per cent incidence, 1 of 7 samples) and in 4 cassava samples from Barinas State (11.4 per cent incidence, 4 of 35 samples) co-infected with Cassava X potexvirus (detected by DAS-ELISA).

To our knowledge, this is the first report of FSD in Venezuela.

Source: ProMed

FEEDING PREFERENCE OF THE AUSTRALIAN LADYBIRD BEETLE *CRYPTOLAEMUS MONTROUZIERI*, ON THREE MEALYBUG PESTS IN ST KITTS AND NEVIS

The predatory ladybird beetle *Cryptolaemus montrouzieri* was introduced to St Kitts and Nevis and the wider Caribbean as part of integrated pest management programme (IPM) to control the pink hibiscus mealybug *Maconellicoccus hirsutus*. *Cryptolaemus* is a generalist predator that feeds on a number of other mealybugs such as the citrus mealybug *Plannococcus citri*, scales, for example the green scale *Coccus viridis* and other related insects. Since the introduction of *Cryptolaemus* at least two

Table 1: Host preference of the Australian ladybird beetle Cryptolaemus montrouzieri[1] expressed as mean number of mealybugs[2] eaten by three beetles (larvae or adults) in 18 hrs

Type of feeding choice test	Stage of beetle	Number of mealybugs eaten by *Cryptolaemus montrouzieri*			SEM	P	Number of replicates
		Pink hibiscus mealybug, *Maconellicoccus hirsutus*	Papaya mealybug, *Paracoccus marginatus*	Citrus mealybug *Planococcus minor*			
Single-choice[3]	3rd instar larvae		Not determined				
	Adults	8.5	3.5	8.8	3.83	0.12	4
Binary-choice[3]	3rd instar larvae		Not determined				
M. hirsutus vs P. marginatus	Adults	4.8	4.3	-	2.5	0.89	4
M. hirsutus vs P. minor	Adults	6.0	-	4.3	4.0	0.77	4
P. marginatus vs P. minor	Adult	-	4.8	6.3	1.1	0.25	4
Multiple choice[4]							
M. hirsutus vs	3rd instar larvae	16.0	4.3	5.5	4.2	0.05	4
P. marginatus vs P. minor	Adults	11.03	8.0	3.8	3.21	0.00	12

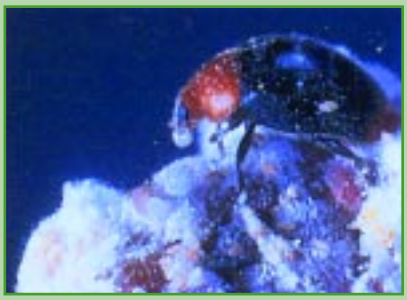
[1]*Three beetle larvae or adults used in all experiments*
[2]*20 mealybugs offered*
[3]*Mann-Whitney Test*
[4]*Kurskal-Wallis Test*

Continued on page 11

Feeding Preference cont'd

other species of mealybugs have been recorded as important plant pests in St Kitts. These are the recently introduced papaya mealybug, *Paracoccus marginatus* and the mealybug *Plannococcus minor* whose history in St Kitts is unknown. All three mealybug species feed on multiple hosts range. It was unclear whether *Cryptolaemus* fed on all three mealybugs and if so under what conditions. Experiments were therefore initiated to determine the feeding preference of *Cryptolaemus* on *M.hirsutus, P. marginatus* and *P. minor*.

Beetles (3rd-instar larvae and adults) were reared on Japanese pumpkins in the laboratory. *Maconellicoccus* was obtained from laboratory cultures whereas the other two mealybug species were collected from the field one day before or on the day experiments were set up. Adults beetles were pre-conditioned for 24 hrs on the test mealybugs, starved for another 24 hrs then introduced into the experiment. Larvae were pre-conditioned for 24 hrs but not starved because of their tendency towards cannibalism. Twenty third-instar females of each of the three species of mealybugs were placed in petri-dishes and three beetles (larvae or adult) introduced and allowed to feed for 18 hrs, in single-, binary- and multiple-choice tests. The numbers of intact or partially eaten mealybugs were recorded at the end of the experimental period. The number of mealybugs eaten completely was assumed to be the difference between the original numbers and those remaining in the petri-dish. Partially or completely eaten mealybugs were scored as having been eaten. Experiments were discarded where insects did not feed or larvae had moulted during the 18-hr experimental period. The results of single and multiple-choice experiments were analyzed by Kurskal-Wallis Test and binary-choice experiments by Mann-Whitney Test using Minitab version 11.



Adult cryptolaemus

Results show that the number of mealybugs eaten by adult beetles in single- and binary- choice experiments were not significantly different (P>0.05), suggesting that there was no feeding preference at that level. In the multiple-choice test, however, adults preferred the pink hibiscus mealybug, *M. hirsutus*, consuming significantly greater (P<0.00) numbers (11.0) than either *P. marginitus* (8.0) or *P. minor* (3.8). Third-instar larvae also consumed significantly greater numbers (P<0.05) of *M. hirsutus* (16.0) than *P. marginatus* (4.3) and *P. minor* (5.5). Beetle larvae and adults have also been observed feeding on all three mealybug species in the field. These results suggest, that in spite of its food preferences *Cryptolaemus* would feed on all three mealybugs species, whether they occurred in pure or mixed colonies. The results show much variation since *Cryptolaemus* is an erratic feeder, but more consistent and conclusive results may be obtained by increasing the number of replicates. However, there is sufficient evidence to conclude that *Cryptolaemus* is an important component in the overall integrated approach to control/management of these mealybug pests. The work should be extended to examine the feeding preference of *Cryptolaemus* on other Homopteran insects and its potential for controlling such pests in St Kitts and Nevis.

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FOOD SAFETY

American Food Agency cracks down on residue checks

The United States Food and Drug Administration (FDA) has, according to this story, announced a crack-down on imported aquaculture products which may contain residues of unauthorized drugs.

The FDA normally inspects foodstuffs entering the United States, but on occasion they carry out more intensive inspection. Recently the Agency has issued a notification that imported marine aquaculture products are to be detained to allow full checks for residues of drugs not authorized for use in the USA.

In fact the USA only authorizes the use of 5 drugs, or chemical substance in aquaculture. Information furnished by the FDA and the Salmon Technology Institute (Intesal) in Chile states that those 5 are the following: formalin solution, MS-222 (tricaine metasulfonate), oxytetracyline, sulfamerazine and sulfadimethoxine/ormetoprim combinations. Residues could lead to import ban.

Source: IntraFish

Food Safety Continued on page 17

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A new search engine specifically for agricultural topics worldwide, *Web-agri*, has been available since February. The Search engine, in French and English, is rapidly expanding and counted 500,000 Web pages in May 2001. Check it out and see if you can find what you are looking for!

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Phytosanitary Alternatives to Methyl Bromide

The proceedings of the NAPPO Workshop entitled "Phytosanitary Alternatives to Methyl Bromide" are available.
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For further information please contact:
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USDA Launches New Information-based Web Site On Food Safety Research Programs

The U.S Department of agriculture has launched a new Web site (http://www.nal.usda.gov/fsrio) aimed at providing a database of food safety research projects to the research community and the general public. The Web site provides detailed information on food safety, research projects, spending and accomplishments by U.S. Federal agencies, along with links to other important food safety research information.

The searchable database provides information on nearly 500 food safety research projects dating from 1998 to the present including research done or funded by: USDA Agricultural Research Service; USDA Cooperative State Research, Education and Extension Service; the Food Safety Consortium (researchers form the University of Arkansas, Iowa State University, and Kansas State University); and the U.S. Department of Health and Human Services' Food and Drug Administration.

Also on the Web site are: Program and planning information, as well as various food safety reports, food safety news and information and more than 100 links to Web-based food safety research information provided by U.S. and foreign governments, and educational and professional organizations.

IICA's New Director General Committed To Modernizing Agriculture

The new Director General of the Inter-American Institute for Cooperation on Agriculture (IICA) advocates the development of strategic alliances with the international community to re-insert the rural and agricultural sector into the globalized economy of the twenty-first century

On taking office as IICA Director General on January 15 2002, Dr. Chelston W. D. Brathwaite pledged to modernize agriculture, hence, helping to make life better for the 177 million people living in poverty in the countries of the Americas, working in tandem with the States and international cooperation agencies and financial institutions.

Dr. Brathwaite, a citizen of Barbados, underscored the need to modernize the rural sector, promote food security and develop an agricultural sector that is economically competitive, technologically prepared, environmentally managed, and socially equitable, in order to meet the challenges of the globalized world of the twenty-first century and seize the opportunities that will open up with the advent of the Free Trade Area of the Americas (FTAA).

The ninth Director General of IICA, an agency of the Inter-American System specializing in agriculture and rural development, Brathwaite was elected on November 26, 2001 by the Inter-American Board of Agriculture (IABA), which is made up of 34 ministers of agriculture representing western hemisphere countries. He takes over from Carlos Aquino of Dominican Republic, who headed the Institute for eight years. C. W. Brathwaite holds a bachelor's degree (B.Sc.) in Agriculture from the University of the West Indies, Trinidad and Tobago; a doctorate (Ph.D.) in plant pathology, from Cornell University in the USA; a Diploma in agricultural development, with distinction, from the University of London; and has completed executive management courses at the INCAE.

C. W. Brathwaite has worked in the USA, Italy, Kenya, Jamaica, Trinidad and Tobago, Costa Rica and Mexico. Dr. Brathwaite has been a member of IICA's International Professional Personnel since 1981, holding the positions of Regional Plant Protection Specialist for the Caribbean; IICA Representative in Trinidad and Tobago; Assistant Director of Operations at Headquarters (Costa Rica); Deputy Representative in Mexico; and Director of Administration, and then Director of the Management Unit for Regional Operations, at Headquarters. At the time of his election he was serving as IICA Representative in Jamaica, Executive Secretary of CARILAC and Advisor to the Director General on Caribbean affairs.

The inauguration, which took place at IICA Headquarters in Coronado, Costa Rica, was attended by leading politicians, academics, scientists and diplomats.

The ceremony was attended, among others, by the Vice President of Costa Rica, Astrid Fischel; the Minister of Foreign Relations of Costa Rica, Roberto Rojas; the Deputy Prime Minister and Minister of Foreign Trade and Foreign Relations of Barbados, Billie Miller; and Agriculture Ministers Roger Clarke (Jamaica), Eligio Jaquez (Dominican Republic), Jorge Rolando Escoto Marroquin (Guatemala), Vere Bird (Antigua & Barbuda), Pedro Jordon (Panama) and Alfredo Robert (Costa Rica). Also in attendance were the Vice Minister of Agriculture of Colombia, Luis Arango Nieto, and U.S. Department of Agriculture Deputy Undersecretary Hunt Shipman.

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NAPPO Phytosanitary Alert System Panel

The NAPPO Phytosanitary alert Systems web page is fully functional with Pest Alerts and/or News Stories being added each week. The alert System site has recorded an increasing number of hits, now totally nearly 13,000. (NAPPO home page www.nappo.org click on "Pest alerts").

Source: NAPPO Newsletter

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Biotechnology and Biosafety under the CBD: an introduction to the Cartagena Protocol on Biosafety

The term "biotechnology" refers to any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for a specific use. When developing the Convention on Biological Diversity, the Government concerned recognized that biotechnology could make a contribution towards achieving the objectives of the Convention, if developed and used with adequate safety measures for the environment and human health. It was therefore agreed to consider the need to develop appropriate procedures to address the safe transfer, handling and use of any living modified organism resulting from biotechnology that may have an adverse effect on the conservation and sustainable use of biological diversity. The Cartagena Protocol on Biosafety, which focuses specifically on transboundary movements of living modified organisms, is the result of that process.

In 1995, the conference of the Parties to the convention established an Open-ended Ad-Hoc Working Group on Biosafety in order to develop a draft protocol on biosafety. Following several years of negotiation, the Biosafety Protocol was finalized and adopted in Montreal on 29 January 2000 at an extraordinary meeting of the Conference of the Parties to the CBD. As of February 2001, the Protocol had been signed by 83 countries, and Bulgaria and Trinidad and Tobago are the first two countries to have ratified the Protocol. The Protocol will enter into force once it has received 50 ratifications. The Biosafety Protocol has been hailed as a significant step forward in that it provides an international regulatory framework to reconcile the respective needs of trade and environmental protection with respect to a rapidly growing global biotechnology industry.

The Protocol thus creates an enabling environment for the environmentally sound application of biotechnology, making it possible to derive maximum benefit from the potential that biotechnology has to offer, while minimizing the possible risks to the environment and to human health

Source: NAPPO Newsletter

Salmonellosis Foodbourne - USA (Nationwide): Inland Death Blamed On Melon

Imported cantaloupes contaminated with a rare strain of Salmonella bacteria killed a 78 year-old Riverside women and sickened nearly 30 other people from California to New York, California health officials said Tuesday. Authorities declined to provide many details about the woman, other than that she was a nursing home patient who became ill 7th April 2001 and died two days later at a Riverside hospital.

At least 17 California residents became ill between April 6th and 24th 2001 after eating contaminated cantaloupe purchased in supermarkets or served in restaurants, according to the state Department of Health Services. Most of those sickened were from Southern California, including three from Riverside County and two from San Bernardino County. One Riverside County victim was a 2 year-old child, said Barbara Cole, who heads Riverside County's disease control program. Contaminated cantaloupes sickened 13 other people in Arizona, Missouri, New Mexico, New York, Oregon, Tennessee and Washington.

California health officials have not yet confirmed exactly where the contaminated produce came from but are "fairly certain this is an imported product" said Jeff Farrar, Head of a state Health Department emergency response team.

At the time of the outbreak, he said, farms in California and Arizona had not yet shipped cantaloupes, and Texas growers had only begun shipping fruit. More domestic fruit is not reaching supermarkets, he said.

Salmonella is the most frequently reported cause of foodborne illnesses and poultry, meat, eggs and dairy products are the most common sources of the bacteria, according to the Federal Centers for Disease Control and Prevention. The bacteria also can be found on fruits and vegetables, particularly those grown or harvested on the ground and eaten raw.

Riverside and San Bernardino counties each report about 150 to 250 cases of Salmonellosis a year, although in most cases the victims recover. Consumers should wash their hands both before and after preparing foods, and should rinse fruits and vegetables under running water to remove bacteria, state and local health officials said. Consumers also should promptly refrigerate any unused portions. People stricken with the bacteria develop symptoms such as fever, abdominal cramps and diarrhea with 3 days of eating contaminated foods. Most people recover within 5 days without medical attention. But for children, the elderly and those with weakened immune systems, the illness can be life-threatening.

There are more than 2400 different strains of Salmonella bacteria, said Kim Woods, an epidemiologist with San Bernardino County's public health department. Most strains are rare. The Salmonella poona strain, which caused this outbreak, is among those rare strains. It has been implicated in food-borne illnesses in the past, Farrar said.

Last year, cantaloupes contaminated with Salmonella poona sickened 46 people, including 26 in California. And in 1991, more than 400 people in 23 states and Canada became ill from the bacterium whose source was reported to be cantaloupe grown in Rio Grande Valley region along the Texas- Mexico Border.

Source: ProMed

JAMAICA GAINS EU APPROVAL FOR SEAFOOD PRODUCTS

In the middle nineties the Ministry of Agriculture and the fishing industry embarked on a comprehensive and elaborate programme aimed at having the nation's fishery products gain entry to the lucrative EU market. This was in direct response to Jamaica and many other countries being de-listed by the EU, which at that time was revamping its rules and regulations concerning the importation of fish and fishery products from third world countries. The challenge of being included on the list was not an easy one and consequently a special task force was established by the Ministry to chart the course the industry should take to gain entry to the EU market.

The EU requirements for placing seafood products on the market are many and varied and some would agree that they are complex as well. The process of certification can take many years.

The requirements for a third country wishing to enter the EU market include but are not limited to:

- The enactment of specific laws deemed equivalent to the relevant laws in the EU.
- The establishment of a seafood inspection system.
- The existence of modern fish processing plants with high levels of hygiene and sanitation.
- The adoption of HACCP and other management tools by processing plants.
- The existence of a competently staffed and well-funded Veterinary Authority with the capability to monitor production areas and systems.
- The existence of a well equipped Veterinary Diagnostic Laboratory capable of carrying out the required diagnostic tests including microbiological and residue analyses.

As the designated Competent Authority recognised by the EU the Veterinary Services Division in conjunction with the special task force proceeded on a programme aimed at attaining EU approval for Jamaica in the shortest possible time.

Some of the major challenges at that time were:

(a) Staffing of the residue laboratory.
(b) Funding for the procurement of specialised laboratory equipment (for example HPLC)
(c) Drafting of new legislation.
(d) Modernisation of processing establishments.
(e) Implementation of HACCP at establishments.
(f) Monitoring of production areas (the prime production areas being approximately 100KM from the south coast of the island!)

By 1998 the Ministry of Agriculture had sent the EU all the requested documents and was of the view that the country had done all that was necessary to meet the EU requirements and consequently a veterinary inspection visit was requested. In April 1999, the first EU Veterinary Inspection Mission visited Jamaica and conducted a detailed and comprehensive inspection to verify whether or not Jamaica could meet the EU requirements.

The three man inspection team spent a week in Jamaica visiting production areas, fishing harbours, processing plants, fishing vessel, reviewing legislation and regulations and examining Veterinary Services Division's documents relating to procedures, staffing and other requirements. Laboratory records and manuals were examined in detail as well as the records of processing plants and establishments.

Despite the efforts of the Ministry of Agriculture and the industry, the Inspection Team found a few areas of deficiencies or of non equivalence with their regulations and the recommendation was made to the Standing EU Veterinary Committee not to place Jamaica on the list at that time. Nevertheless the Inspection Team felt that with the necessary effort and resolve the deficiencies could be corrected in a short time. In this regard the Veterinary Service Division and the industry worked assiduously together to ensure that the deficiencies were corrected. Despite a few legal problems and setbacks by the beginning of 2000 the decision was made to re-invite the EU's Veterinary Inspection Mission for a second visit. That mission arrived in Jamaica on March 31, 2000, almost a year after the first visit. During the reassessment mission the inspection team went through the similar procedures as it did during the first visit. The team arrived at the conclusion that the major deficiencies were corrected and that the recommendation would be made to the EU's Standing Veterinary Committee for Jamaica be placed on the list.

So by Commission Decision of 22nd, December 2000, Jamaica was placed on the official list of third countries eligible to export marine gastropods (conch) and other seafood products to the EU.

To date, nine establishments have been approved by the Veterinary Services Division for export to the EU. All but one export conch, which has a steady market in France. It is anticipated that more companies will seek certification next year. The Veterinary Services Division now has the challenge of maintaining the high standards set by the EU as any deviation or deficiency could result in Jamaica being de-listed.

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MULTISYSTEMIC WASTING SYNDROME, SWINE - UK

A new deadly disease is stalking Britain's pigs, threatening the lives of animals which just months ago escaped slaughter during a foot-and-mouth disease (FMD) epidemic and classical swine fever (CSF) outbreak, veterinarians said. The disease, called Post-weaning Multisystemic Wasting Syndrome (PMWS), which takes two forms, has spread across 40 percent of the England's pig herd and is expected to kill thousands more animals in what vets said could be "the final blow" for dispirited farmers.

"I think the whole pig population is at risk," Roger Harvey, a pig specialist from Britain's most densely populated pig area in eastern England. Coming at the end of a devastating FMD epidemic and just months after Britain fought CSF, the new disease has hit hard an industry reeling from the effects of low prices and a strong pound.

Almost 250,000 pigs were slaughtered so far to combat CSF and FMD, and experts say another 300,000 could die from the new disease, PMWS. Harvey said spread of the disease, which can cause sudden death in pigs or leave them listless and gaunt, had already reached epidemic proportions and had no known cure. It was closely linked with another disease, Porcine Dermatitis Nephropathy Syndrome.

"These diseases are spreading fairly steadily throughout Britain," he said, adding they were first uncovered in Britain about 2 years ago but were contained in one area. In recent months, they have spread north. Producers have already lost 21 million pounds this year due to increased mortality and feeding costs to get surviving pigs back up to a marketable weight.

Harvey said, with most cases lasting for around 2 years, the epidemic is set to continue. He said "The virus is very resistant, so you are going to get it spreading on lorries, and probably locally, it will spread on the wind". "Clinicians in England are now generally of the opinion that birds are likely to be a significant vector of PMWS," said Andrew Gresham, Veterinary Laboratories Agency, adding the group had carried out a large case study to aid further research.

Vets agreed more research was needed to find a way to treat the illness, which thrives on dirty or mismanaged farms, but that would not help farmers in the short-term. "The main methods we are using to control it are good hygiene and good husbandry. It's all about management. There is no magic drug to give them," Harvey said. "It's another pressure after FMD and CSF."

Source: ProMed

CARAPHIN News provides a medium for disseminating technical information on matters related to agricultural and environmental health, particularly information that is generated in and should be shared with the Caribbean Region. The editor welcomes submissions on any topic related to this broad mandate together with appropriate illustrations.

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PUBLISHER: Morton Publishing
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