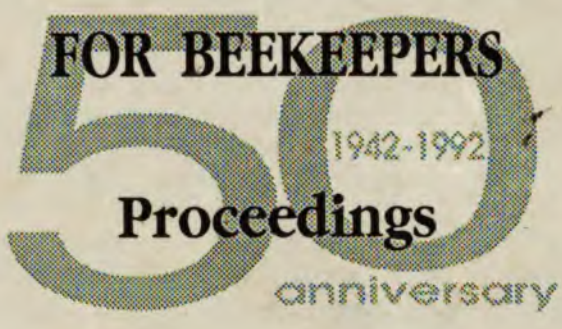
IICA

FIRST REGIONAL TRAINING WORKSHOP

FOR BEEKEEPERS



Proceedings

Castries, St. Lucia
May 11 - 13, 1992

IICA OFFICE IN SAINT LUCIA

WHAT IS IICA?

The Inter-American Institute for Cooperation on Agriculture (IICA) is the specialized agency for agriculture of the inter-American system. The Institute was founded on October 7, 1942 when the Council of Directors of the Pan American Union approved the creation of the Inter-American Institute of Agricultural Sciences.

IICA was founded as an institution for agricultural research and graduate training in tropical agriculture. In response to changing needs in the hemisphere, the Institute gradually evolved into an agency for technical cooperation and institutional strengthening in the field of agriculture. These changes were officially recognized through the ratification of a new Convention on December 8, 1980. The Institute's purposes under the new Convention are to encourage, facilitate and support cooperation among the 33 Member States, so as to better promote agricultural development and rural well-being.

With its broader and more flexible mandate and a new structure to facilitate direct participation by the Member States in activities of the Inter-American Board of Agriculture and the Executive Committee, the Institute now has a geographic reach that allows it to respond to needs for technical cooperation in all of its Member States.

The contributions provided by the Member States and the ties IICA maintains with its twelve Permanent Observer Countries and numerous international organizations provide the Institute with channels to direct its human and financial resources in support of agricultural development throughout the Americas.

The 1987-1991 Medium Term Plan, the policy document that sets IICA's priorities, stresses the reactivation of the agricultural sector as the key to economic growth. In support of this policy, the Institute is placing special emphasis on the support and promotion of actions to modernize agricultural technology and strengthen the processes of regional and subregional integration.

In order to attain these goals, the Institute is concentrating its actions on the following five programs: Agricultural Policy and Planning; Technology Generation and Transfer; Organization and Management for Rural Development; Trade and Agroindustry; and Animal Health and Plant Protection.

These fields of action reflect the needs and priorities established by the Member States and delimit the areas in which IICA concentrates its efforts and technical capacity. They are the focus of IICA's human and financial allocations and shape its relationship with other international organizations.

The Member States of IICA are: Antigua and Barbuda, Argentina, Barbados, Belize, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Dominica, the Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, St Kitts and Nevis, St Lucia, St Vincent and the Grenadines, Suriname, Trinidad and Tobago, the United States of America, Uruguay and Venezuela.

The Permanent Observer Countries of IICA are: Arab Republic of Egypt, Austria, Belgium, Federal Republic of Germany, France, Israel, Italy, Japan, Netherlands, Portugal, Republic of Korea and Spain.

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IICA

INTER-AMERICAN INSTITUTE FOR COOPERATION ON AGRICULTURE — OAS

FIRST REGIONAL TRAINING WORKSHOP

FOR BEEKEEPERS

Proceedings

Castries, St Lucia

May 11 - 16, 1992

Organizing Committee:

Jerry La Gra, IICA, Saint Lucia

Kenny Daniel, Ministry of Agriculture, Saint Lucia

Abudu Jaima, EAG Antigua and Barbuda

Jorge Murillo-Yepes, IBRA, Grenada

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LIST OF ACRONYMS AND ABBREVIATIONS

ACP	Asian Caribbean Pacific Members of British Commonwealth
AFB	African Honey Bees
CACA	Caribbean Apicultural Cooperative Association
CADA	Caribbean Apicultural Development Association
CADCA	Caribbean Apicultural Development Cooperative Association
CANARI	Caribbean National Resources Institute
CARDI	Caribbean Agricultural Research and Development Institute
CARICOM	Caribbean Community
CEHI	Caribbean Environmental Health Institute
CFDC	Caribbean Farmers Development Company
CIF	Cost Insurance Freight
COGUAMIEL	Cooperative Guadeloupeenne de Miel
EAG	Environmental Awareness Group
ECLAC	Economic Commission for Latin America and the Caribbean
EEC	European Economic Community
EHB	European Honey Bees
ENCORE	Environmental and Coastal Resources Project
FAVA/CA	Florida Association for Voluntary Agencies for Caribbean Action
FAO	Food and Agricultural Organization
FF	French Franc
FLD	Forests and Lands Department
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Profit
IICA	Inter-American Institute for Cooperation on Agriculture
IBRA	International Bee Research Association
MOA	Ministry of Agriculture
OAS	Organisation of American States
OECS	Organisation of Eastern Caribbean States
ODA	Overseas Development Authority
PADF	Pan American Development Fund
PCB	Pesticides Control Boards
SCMA	Standing Committee of Ministers of Agriculture
SVG	St Vincent and the Grenadines
TFAP	Tropical Forest Action Plan
VSO	Volunteer Service Overseas
USAID	United States Agency for International Development

FOREWORD

The lexicon of development organisations in 1992 highlights such terms as privatization, economic viability, environmentally friendly and sustainability. One word relevant to all these terms is beekeeping. The art of beekeeping is demonstrative of how individuals can undertake sustainable economic activities which are beneficial to both humans and the environment. With these thoughts in mind the Regional Beekeepers Workshop was organised to evaluate the present state of the art of beekeeping in the Eastern Caribbean and to provide guidelines for its development.

Whenever large numbers of persons from different countries are brought together for a meeting, seminar or workshop, the costs are relatively high. As available resources for rural development decline, as is presently the case, the efficiency in their use must be increased. One way of maximizing the use of scarce resources is through joint meetings where several objectives can be achieved simultaneously. The First Regional Training Workshop for Beekeepers, as the name indicates, was such an initiative.

Participants in the Workshop included 29 beekeepers, 19 technical persons from the public sector and support institutions and 7 representatives of agro-forestry/environmental development projects. The purpose of including this latter group was to establish linkages between beekeepers and administrators of projects having resources to support environmentally friendly projects.

Following the Workshop, three professional apiculturists and Workshop participants provided technical and hands-on training to nine quarantine officers/technicians from five islands and twenty-nine beekeepers from St Lucia, in three separate training activities.

Judging from the favourable response of the participants, the products from the Workshop and the follow-up training, the methodology seems to have been both effective and efficient in the use of scarce resources.

The IICA project "Strengthening of Producer Organisations in the Caribbean" is proud to have taken the leadership in the organisation of this event.

Jerry La Gra
Rural Development Specialist
IICA Office in Saint Lucia

ACKNOWLEDGEMENT

The organisation of this First Regional Training Workshop for Beekeepers would not have been possible without the cooperation and financial and technical support from a number of sources.

Barclays Bank PLC readily responded to the request for financial assistance and funded travel, food and lodging expenses for nineteen participants from six countries in the OECS and Barbados.

The National Resources Management Unit of the OECS, with funding provided through the USAID Environmental and Coastal Resources Project (ENCORE) in Saint Lucia, financed food and lodging expenses for seven participants and lunches for a number of local beekeepers.

The Inter-American Institute for Cooperation on Agriculture (IICA) provided funding for travel, food and lodging for five participants from Martinique, Guadeloupe and Trinidad and Tobago. In addition it provided all logistical and administrative support and materials.

To assure a high level of technology transfer, the services of three expert tropical apiculturists were provided, one by the University of Puerto Rico, Mayaguez and two from the University of Florida in Gainesville. The travel, food and lodging costs of the two specialists from Florida were provided by the Florida Association of Voluntary Agencies for Caribbean Action (FAVA/CA).

The Ministry of Agriculture, Lands, Fisheries and Forestry of Saint Lucia deserves a special thanks for hosting this event.

To all the above institutions the beekeepers of the Eastern Caribbean are thankful.

Beekeepers of the Eastern Caribbean

SECTION 1

INTRODUCTION

AGENDA

OPENING CEREMONY

CONCLUSIONS AND RECOMMENDATIONS

INTRODUCTION

RATIONALE FOR ORGANISING THE WORKSHOP

Efforts are being made throughout the Caribbean to identify and introduce or expand new crops/products which can generate economic returns for rural people. The production of honey and other hive products is one enterprise which has not been given adequate attention. Beekeeping has proven to be a good source of income for small farmers, women and youth groups. It has the added advantage that it is environmentally friendly and can be easily integrated into agro-forestry projects. While the potential benefits of efficient beekeeping are many, the industry in the Eastern Caribbean is in its incipient stage. Productivity per hive in the Windward Islands is very low due primarily to inefficient hive management and the gradual destruction of bee pasture. While the sub-region has a comparative advantage of being basically free of diseases, the risk of losing such an advantage is growing with the increasing importation of bees, honey, sub-products, beekeeping inputs and the growing risk of Africanization of bee populations.

WORKSHOP OBJECTIVES

The objectives of the Workshop were to:

1. Exchange information on the present situation, constraints and potential for development of beekeeping in each of the participating islands.

2. Review the current status of bee sanitation in the sub-region and determine preventive strategies to control exotic pests and diseases and the needs for beekeeping legislation in the Eastern Caribbean.

3. Evaluate market opportunities for honey and other hive products.

4. Determine the feasibility of integrating beekeeping with agro-forestry and environmental protection projects in the Eastern Caribbean.

5. Discuss the technical and economic advantages and disadvantages of organisations of beekeepers.

6. Identify opportunities for economically sustainable development projects.

EXPECTED OUTPUTS FROM THE WORKSHOP

The Workshop was to generate the following results:

1. Definition of a regional strategy for the development of the beekeeping industry in the sub-region, closely integrated with forestry and environmental projects.

2. Approximately 25 beekeepers better informed in respect to the need for improved cultural and management practices; controls on bee and bee products imports, and development of bee pasture, among others.

3. Identification of project ideas for promoting the development of beekeeping which are sustainable and environmentally friendly.

4. Country papers with baseline information on beekeeping in each participating country.

5. Plans for active participation in the 5th International Conference on Apiculture in Tropical Climates, Trinidad and Tobago, September 1992.

WORKSHOP METHODOLOGY

During the first day of the workshop, representatives from each country made short presentations on the current situation of beekeeping in their respective countries. Each paper was followed by a short period for clarification. At opportune times plenary discussions on beekeeping in the respective islands were held.

During the second day, a series of presentations on important topics related to beekeeping were made by guest speakers. Priority problems were identified and possible solutions were discussed and evaluated.

The third day began with the review and modification of a regional project proposal. This was followed by a plenary session to discuss the best mechanism for developing beekeeping within the region. A field trip to Roots Farm apiaries and honey house was carried out in the afternoon where the Workshop was formally closed.

The three days following the Workshop were dedicated to training. On Thursday an all day session for beekeepers from northern Saint Lucia was held at Vigie Beach Hotel. On Friday an all day training session for Quarantine Officers from the OECS was held at Union. On Saturday an all-day theoretical/practical training for beekeepers from the south of Saint Lucia was held at Vieux Fort.

TARGET BENEFICIARIES

In total, 55 participants represented 12 countries. These were composed of 29 beekeepers, 19 technical persons and 7 representatives of environment related institutions (Annex 1).

The intended beneficiaries of the Workshop were regional beekeepers and technical support personnel from both the public and the private sectors. In addition, technical personnel from agro-forestry and environmental projects were invited with the intention of establishing bridges between beekeepers and projects promoting the development of natural resources.

SPONSORS

The Workshop was jointly sponsored by the Ministry of Agriculture in Saint Lucia and the Office of the Inter-American Institute for Cooperation on Agriculture (IICA) in the OECS. Financial assistance was provided by Barclays Development Fund in the Caribbean, the USAID funded Environmental and Coastal Resources Project (ENCORE) and IICA. The Florida Association of Voluntary Agencies for Caribbean Action (FAVA/CA) funded two apiculture specialists from Florida.

PLANNING AND ORGANISING COMMITTEES

The Workshop was planned and managed by the following persons:

Jerry La Gra, IICA Rural Development Specialist
Kenny Daniel, Senior Animal Husbandry Officer, Ministry of Agriculture
Abudu Jaima, Environmental Awareness Group, Antigua
Jorge Murillo-Yepes, IBRA Representative, Grenada

Logistics and support services were provided by:

Lenita Weekes-Auguste, Secretary, IICA Office in Saint Lucia
Deborah Charles, Secretary, IICA Office in Saint Lucia
Bernitha Clery, Administrator, IICA Office Saint Lucia
Sandra Toussaint, Secretary, IICA Office in Saint Lucia
Kenny Daniel, Senior Husbandry Officer, Ministry of Agriculture, Saint Lucia

The proceedings were edited by Jerry La Gra, in collaboration with

Maria Grech, Consultant
Lenita Weekes-Auguste, Secretary, IICA Office in St Lucia

AGENDA

The Agenda as executed is presented below.

Monday, May 11, 1992:

9:00 am. **REGISTRATION**

10:00 am. **OPENING CEREMONY**

- Opening Remarks, Chairperson Jerry La Gra, Rural Development Specialist, IICA
- Welcome and Address by Reginald Pierre, Director of Operations, IICA Caribbean
- Feature Address, Hon. Ira d'Auvergne Minister of Agriculture, Lands, Fisheries and Forestry
- Vote of Thanks, Kenny Daniels, Senior Livestock Officer

10:30 am. **REFRESHMENTS**

11:00 am. **COUNTRY PRESENTATIONS** (10 minute presentations with 5 minutes for clarifications):
- Antigua and Barbuda;
- Nevis;
- Montserrat;
- Barbados;
- General discussion;
- Dominica;
- Grenada;

1:00 pm. **LUNCH**

2:00 pm. **COUNTRY PRESENTATIONS CONTINUED:**
- Saint Lucia;
- Roots Farm Apiary Project;
- St. Vincent & the Grenadines;
- Guadeloupe;
- Martinique;
- Trinidad;
- General discussion;
- Puerto Rico;
- Florida;

Refreshments were served during the presentations

Tuesday, May 12, 1992:

9:00 am.	**Panel: The Africanized Honey Bee in the Caribbean:** current status and future of the industry, M.K.I. Hallim, Inspector of Apiaries, Trinidad & Tobago, Daniel G. Pesante, Apiary Specialist, Colegio de Ciencias Agricolas, Mayaguez, Puerto Rico
10:00 am.	**Needs for Bee Keeping Legislation in the Caribbean:** (importation of bees and bee products; quarantine controls; others), Abudu Jaima, EAG, Antigua
10:30 am.	**Present situation in respect to organizational structure, quarantine, customs controls and ongoing actions,** Everton Ambrose, IICA Saint Lucia
11:00 am.	**REFRESHMENTS**
11:15 am.	**Panel: Bee Sanitation in the Eastern Caribbean, current status, exotic pests & diseases and preventive strategies,** Laurence Cutts, USDA Chief Apiary Inspector, Florida; Tom Sanford, Extension Apiculturist, U. of Florida; D.G. Pesante, Mayaguez, Puerto Rico
12:15 pm.	**Agro-forestry and environmental protection develop-ment projects underway in the Eastern Caribbean,** Richard Ince (PADF); Crispin d'Auvergne (ENCORE); Gabriel Charles (TFAP); Abudu Jaima, EAG, Antigua; Eddy Le Blanc, DCA, Dominica
1:15 pm.	**LUNCH**
2:00 pm.	**Managing Nutritional Resources for Honey Bees,** Tom Sanford, Extension Apiculturist
2:45 pm.	**Product Diversification and Market Opportunities,** Jorge Murillo-Yepes, Beekeeper/IBRA Representative, Grenada
3:30 pm.	**Raising Queens in the Tropics,** Laurence Cutts, USDA Chief Apiary Inspector, Florida
4:15 pm.	**REFRESHMENTS**
4:30 pm.	**Organizing Beekeepers in the Eastern Caribbean, advantages and disadvantages,** Abudu Jaima, EAG

5:00 pm. **Role of Eastern Caribbean Beekeepers in the International Conference on Apiculture in Tropical Climates, Trinidad and Tobago, September 1992, Jorge Murillo-Yepes, Regional Rep. of International Bee Research Association and MKI Hallim, Coordinator of Conference in Trinidad and Tobago**

Wednesday, May 13, 1992:

8:30 am. **Review of Project Proposal: "Development of Beekeeping as a Self-Sustaining Economic Activity in the Eastern Caribbean," Jerry La Gra, IICA OECS**

9:00 am. **Plenary session for discussion and formation of regional association of beekeepers**

12:30 pm. **LUNCH**

1:30 pm. **Field trip to Roots Farm apiary and honey house**

2:30 pm. **Inauguration of Roots Farm Honey House:**

- **Welcome and description of Roots Farm by Farm Director;**
- **Words from IICA Representative;**
- **Role of the US Peace Corps, Peace Corps Representative and PCV Beekeeper (Hugh Sauer);**
- **Opening of the Honey House, Roots Farm Representative;**
- **Refreshments.**

3:30 **Official closing of Workshop**

OPENING CEREMONY

The opening session of the Workshop was well attended. Participants included beekeepers from 12 countries and representatives of Ministries of Agriculture from 6 countries; representatives from 5 agro-forestry or environmental projects were present as were numerous persons from the public and private sectors in Saint Lucia.

The Chairman introduced the importance of the topic of beekeeping. He began by pointing out that the total population of Latin America and the Caribbean is on the order of 450 million people of which 275 million (61%) live in abject poverty. He went on to say that efforts to reduce this level of poverty have not met with a great deal of success. For instance, he said, models of agrarian reform, community development and integrated rural development have all been tried in most countries, but success stories are few and far between. In his opinion, the one thing that all these models had in common, was the heavy involvement of the public sector and top down planning and control.

In making reference to the decade of the 90's, the Chairman identified many of the "buzz" words being used in developmental efforts: modernization, democratization, privatization, sustainability, environment friendly, youths and women, to name a few. He stressed sustainability as perhaps the key to development and referred to the importance of development projects which were sustainable in both economic and environmental terms.

He told the group that a good example of a sustainable project is beekeeping. He went on to point out how beekeeping can involve men, women and youths; how it can generate rural employment in the production of honey and a variety of hive products; how it can stimulate democratic activity through rural organisations and how it is friendly to the environment and stimulates democratic activity through rural organisations and how it is friendly to the environment and stimulates planting over destruction of trees and other vegetation.

The Chairman ended his introduction by stating that the organizers were pleased by the turnout and enthusiasm of the participants and notes that the first objective of the Workshop had already been met by bringing together so many representatives of public and private sectors and support groups.

The Chairman then went on to present the members of the head table: Hon Ira d'Auvergne, Minister of Agriculture, Lands, Forestry and Fisheries in Saint Lucia, Dr. Reginald E Pierre, IICA Director of Operations (Caribbean Area) and Kenny Daniel, Senior Animal Husbandry Officer, Ministry of Agriculture, Saint Lucia.

ADDRESS

Reginald E Pierre

Director of Operations (Caribbean Area) and IICA Representative in Barbados

Mr. Chairman, Hon Ira d'Auvergne, Minister of Agriculture, Mr. Kenny Daniel, Senior Livestock Officer, Distinguished Guests, ladies and gentlemen.

It with great pleasure that I welcome you to this very important workshop on behalf of the Director General of IICA and the other sponsoring agencies. I note that you have come from all the Eastern Caribbean countries, including the French speaking territories of Martinique and Guadeloupe, together with resource persons from Puerto Rico and Florida.

It is always a pleasure for me to be in Saint Lucia, and it is even more so on this occasion, that I have this opportunity to participate with you in this workshop and to say "congrats and welcome back" to Hon Ira d'Auvergne, Minister of Agriculture.

Mr. Chairman, personally, I know very little about bees and beekeeping, but I do know that honey and other hive products have long been highly valued commodities. Perhaps in an effort to convince me of the importance of this workshop, Mr. La Gra drew my attention to the fact that honey features in the bible in the book of Genesis, Chapter 43 Verse 11. As a good scientist, I checked the reference and found that it reads as follows: "And their father Israel said unto them, it must be so, now do this: take of the best fruits in the land in your vessels and carry down the man a present -- a little balm and a little honey, nuts and almonds". So clearly, honey was known from ancient times and it continues to be a highly prized commodity. In fact, given the current trend towards increased health consciousness among the world's peoples, its importance as a 'health food' seems likely to increase.

Perhaps I should take this opportunity to tell you a little about IICA. This will enable you to put in perspective IICA's involvement in initiatives such as this. The Inter-American Institute for Cooperation on Agriculture (IICA) is the specialised agency for agriculture in the Inter-American system. It is an inter-governmental organisation with 32 Member States in this Hemisphere, 10 of which are members of CARICOM, current exceptions being the Bahamas, Belize and Montserrat. I say 'current exceptions' because it is my understanding that Belize, having recently become a member of OAS, may soon be joining IICA and the legal people are now examining the situation in regard to Montserrat. In addition, IICA has 14 observer countries that support its activities, the most recent being the European Community.

IICA was established in 1942 and is thus celebrating its 50th Anniversary this year. The Institute was founded initially as a teaching and research agency for Latin American countries but as the needs of the countries changed, IICA also

changed and has evolved into a technical cooperation agency, the purpose of which is to "encourage, promote and support the efforts of its Member States to achieve agricultural development and rural well-being" - hence its involvement in this initiative.

Although IICA is one of the oldest technical cooperation institutions in the world its association with the Caribbean has been relatively recent. Jamaica was the first English-speaking Caribbean country to join IICA in 1972 and the most recent was St Kitts and Nevis. In fact, it was only last month that Dr Pineiro, IICA's Director General, signed the Basic Agreement with St Kitts and Nevis.

Notwithstanding its recent association with the English-speaking Caribbean countries, the Institute has taken a number of initiatives in support of agricultural development and rural welfare to date and expects to continue with even greater intensity in the future.

IICA concentrates its activities in five Programme Areas. The First Programme deals with Policy Analysis and Planning, the objectives of which are to enhance institutional capabilities for developing agricultural policies and strategies as required to modernize the production apparatus and bring about sustainable development. It also promotes a broader agri-food sector view, which takes into account both its relations with other productive and service sectors and the new context of trade liberalization.

The second Programme concerns Technology Generation and Transfer, and aims to promote and support actions to improve technological policy design; facilitate reciprocal cooperation in technology transfer, and promote the modernization of national research and technology transfer systems.

Programme III is concerned with Organisation and Management for Rural Development and aims at studying the conditions of the rural poor and special groups (women and indigenous peoples) with a view to designing strategies to involve them in the agricultural modernization process. It also aims to strengthen rural development institutions and facilitate horizontal cooperation in matters pertaining to rural development.

The fourth Programme has been recently renamed Trade and Integration. It aims at supporting information systems to serve trade activities, multi-lateral negotiations and export promotion. It also aims to analyse degrees of competitiveness and complementarity among the agricultural sectors and strengthen trade liberalization and agricultural integration.

Programme V is called Agricultural Health. It concerns with the development of harmonized information systems for monitoring animal and plant diseases and pests. It also assists in the design of harmonized legislation and regulations to facilitate increased exports, and promotes sustainable practices for controlling diseases and pests.

Mr. Chairman, foremost among the projects and activities that IICA has carried out in the OECS has been its support to farmers and farmers

organisations. One very significant activity of that project was the linkage it facilitated between farmers organisations in Antigua and Barbuda, Barbados, Dominica, Grenada, Saint Lucia and St. Vincent and the Grenadines in what was known as the Inter-island Steering Committee of Farmers Organisations. This led to the formation of the Caribbean Farmers Development Company (CFDC) in 1990, a registered Company in Dominica, which is actively involved in providing technical assistance, information and credit to farmers organisations, some of which now are exporting fresh produce to Europe and North America.

Another important output of this project is the newspaper "Focus" of which 3,000 copies are published quarterly and distributed throughout the region and beyond, thus providing not only a source of important information for farmers and planners of the region but also a vehicle through which they can share experiences.

Mr Chairman, it is no secret that the performance of Caribbean agriculture over the past several years has been less than satisfactory, particularly in regard to the traditional export crops. This is so, notwithstanding the substantial inflows of external aid over the years.

We have now entered a period in which external financial aid, both in terms of grant funds and concessionary loans, is becoming increasingly scarce. This, together with the current world trend towards 'opening' to hitherto protected markets, will adversely affect the economies of Caribbean countries, whose major traditional exports (sugar and bananas) have benefitted from secured markets and preferential treatment in the UK and also in North America in the case of sugar.

The performance of the banana industry has been somewhat better, as evidenced in some Windward Island States, but there have been and still are serious concerns about the future of Caribbean bananas after the European Common Market comes into being later this year. For a time, things looked quite bleak as the stage was set to include bananas with the other agricultural commodities currently under negotiation in the Uruguay Round of the General Agreement of Tariffs and Trade (GATT). Conscious of these concerns, in March this year, IICA facilitated a meeting at its Headquarters in Costa Rica between Ministers of Agriculture from banana producing countries in Central America and the Caribbean in an attempt to resolve problems of common interest in relation to the export of bananas to Europe. As you know, the main issue relates to competition from lower priced bananas from some Central American countries and Ecuador, in a free market situation.

The communique which was released after that meeting clearly indicated the different view points of Caribbean banana producers and those of Central America. Minister Mullings of Jamaica, speaking on behalf of the Caribbean, focused on the clause of the Lome Convention which states that no ACP State "shall be place as regards access to its traditional markets, in a less favourable position than in the past or present". He stressed that Caribbean countries "will fight tooth and nail to maintain our little slice of the market", and was satisfied that the Commissioners in Brussels will "propose a solution consistent with Lome and the banana protocol".

As you are no doubt aware, the Commissioners recently proposed the continuation of quotas plus 20% tariff on Latin American bananas, but this has only been achieved through strong political intervention by Caribbean leaders at the highest political level and the Prime Minister of Saint Lucia played a leading role in that regard. Our banana farmers can now contemplate a sigh of relief, so to speak, but a best, this should be viewed as 'temporary relief'. Caribbean countries must now do everything possible to become more competitive, not only in banana production, but in agriculture generally.

The need to diversify Caribbean agriculture into commodities which have significant economic and export potential is well recognized and here one should make reference to the important steps being taken in OECS under the coordination and guidance of the Agricultural Diversification Coordinating Unit.

In the diversification thrust, Caribbean countries which are comparatively high cost producers, will have to find niche markets for high priced commodities (what one of my colleagues refers to as boutique agriculture) e.g. Jamaica's Blue Mountain coffee; ornamentals; ethnic markets for commodities that are quantitatively unattractive to potential competitors; exploit phyto and zoo sanitary advantages such as the fruit fly-free status of Grenada and St. Vincent and the Grenadines; exploit ecological advantages which permit out-of-season production such as mangoes in Haiti and perhaps early grapefruit from Dominica, and focus on unusual genetic resources in the region e.g. Barbados Black Belly sheep, Jamaica Hope and Jamaica Red cattle, Sea Island Cotton.

In addition, Caribbean countries will have to look more critically at agro-industrial possibilities, and opportunities for developing integrated industries to take advantage of what economists call 'value added' as our countries can no longer rely solely on the production of primary commodities. Further, Mr. Chairman, Caribbean farmers and farmer groups need to have the necessary entrepreneurial skills, dynamism and foresight to be able to operate successfully in the increasingly complex market scenarios that are unfurling - indicating the need for what some of my colleagues refer to as the 'new farmer'.

Mr. Chairman, I indicated earlier that the Institute had reached a significant milestone in its history. Throughout the year, IICA will be focusing on a number of activities at Headquarters and in the Member countries and it is perhaps fitting that this workshop is the first event in the OECS that we think is of sufficient significance to mark IICA's 50 years of effort in supporting rural development in Latin America and the Caribbean.

With regard to the subject of this workshop, I read a booklet on beekeeping recently and was struck by a number of points. It stated that "Beekeeping provides rural people in developing countries with sources of income and nutrition. It is a sustainable form of agriculture which is not detrimental to the environment, indeed it provides economic reasons for the retention of native habitats". The writer made several additional points that are noteworthy: the ease with which basic beekeeping techniques can be acquired; the inexpensiveness of the necessary equipment; that a wide range of age groups and both sexes can easily get involved; that bees do not require daily attention and can be attended to when other work allows and their value in cross-pollination of many crops.

These appear to be some very favourable factors in relation to beekeeping and while I have not looked critically at the economic aspects, there are indications that it can be an economically viable activity, which can provide linkages to other sectors of the economy. Candle making and batik processing in relation to the tourist industry are obvious examples.

It is my understanding also that this part of the Caribbean is virtually free of diseases and pests of bees, a fact which can open up possibilities of utilizing the region as a commercial queen rearing centre, given this apparent zoo sanitary advantage.

Finally, Mr. Chairman, may I again say how pleased we at IICA are to co-sponsor this workshop with the Ministry of Agriculture of Saint Lucia, and we are truly grateful for the financial assistance received from Barclays Bank Development Fund, the USAID funded Environmental Coastal Resources (ENCORE) project, and the Florida Association of Voluntary Agencies for Caribbean Action (FAVA/CA). This regional workshop is demonstrative of what can be achieved when organisations combine their limited resources to target a worthwhile initiative. I am confident that we will see more and more such collaborative efforts in the future.

May I again thank you for your presence and your patience. I wish that your deliberations during the next few days will be fruitful and will lead to practical and realistic proposals for follow-up action.

Thank you.

FEATURE ADDRESS

Honourable Ira d'Auvergne

Minister of Agriculture, Lands, Forestry and Fisheries

Thank you Mr. Chairman, let me first thank you for your very kind remarks. Mr. Chairman, Jerry La Gra, Rural Development Specialist of IICA, Dr. Reginald Pierre, Director of Operations, IICA Caribbean, with whom I have had a very very long association going back as far as 1975 and this association; Mr. Kenny Daniel, Senior Livestock Officer, course participants, ladies and gentlemen.

I am not surprised that we have ladies in our midst in fact I am disappointed that they are so few since this is one of the areas in which the female of the species is indisputably the boss. Without the queen we have no honey. Nonetheless, I hope we will be seeing many more women beekeepers as the industry develops.

Mr Chairman first of all let me on behalf of the Ministry of Agriculture and the Government, welcome all of you, especially our overseas participants, to this regional beekeepers workshop co-sponsored by IICA and my Ministry. Indeed my Ministry is pleased to be associated with this training workshop at this time when intense efforts are being made towards diversification of the agricultural sector. Beekeeping, while considered to be an occupation that has been undertaken in our region for quite some time, is yet to achieve its full potential in terms of the level of efficiency in the industry and the development of products other than honey. There is still therefore, considerable room for improvement as well as increased opportunities for income generation, so that the industry can contribute more substantially to the economic development of the region.

The dual benefits to be derived from beekeeping and agricultural production, especially crop production, has long been recognised and promoted. On the one hand, bees play a very important role in pollination of a large number of economic crops, while at the same time converting the nectar which they receive from the flowers into honey and wax. Additionally a large number of by-products are made from the above, creating further opportunities for diversification and widening of its income base. The processing aspects of the industry, which lends itself to home base cottage style developments, enhances further the opportunity for employment of rural people, in particular youth and women.

Indeed we should take a second look at the considerable potential which exists within the beekeeping industry and the tremendous benefits which can be derived therefrom. I think it is important that I should emphasize that while the potential for commercial activity within the industry is considerable, adequate marketing approaches must be adopted if the full benefits are to be realized. In particular, we must ensure that products derived from the industry are presented in an acceptable manner. The products must be of the highest

quality, suitably and attractively packaged, and competitively priced. No stone should be left unturned in our quest to establish ourselves on the market and to remain there.

The highly competitive nature of all aspects of agricultural production dictate that the application of new and appropriate technology is vital to increased efficiency and productivity. Beekeeping is no exception if those involved in this business are to remain competitive and enjoy good prices for their products. Productivity per hive must be increased through improved management of the hive as well as improvement in the management of the environment in which the bees obtain their food.

Efforts must be made therefore, to continue and to accelerate the training of our farmers to ensure that they are equipped with the latest techniques available to help them increase production. Training sessions such as this one are an avenue by which the new technologies can be passed on to the farmers. They also provide an excellent opportunity for getting beekeepers together to permit them to interact with their colleagues from different parts of the region and to exchange ideas on beekeeping techniques generally and to establish contacts.

I urge that these training efforts be continued, both at the regional and national levels, and that we seek to involve as many of our beekeepers, and potential beekeepers as possible.

I want to take this opportunity to congratulate IICA for their efforts in making this workshop a reality and for their continued assistance towards the upgrading of the beekeeping industry in the region. It is also a good opportunity for me on behalf of the Ministry, the Government and people of Saint Lucia to congratulate IICA on having achieved fifty years of service to the Americas as a major regional agricultural organisation.

We in Saint Lucia are indeed grateful for the assistance we have received so far and for the excellent relationship that has existed between our two organisations since the establishment of the local office. Indeed we look forward to many more years of cordial and productive relations as we journey into the twenty-first century.

I want to give all those involved in the industry, especially those at the local level, the assurance that my Ministry will continue to give support to the development of the sector as we all seek to increase its importance to the economy. In this regard I am certain that I also speak on behalf of the other countries represented here. I trust that this workshop will be a total success and that you will endeavor to put into practice the skills you would have acquired when you return to your various home bases.

Once again I thank you for the opportunity of addressing you and sharing these thoughts with you as I commence yet another term as Minister for Agriculture, I thank you.

WORKSHOP CONCLUSIONS/RECOMMENDATIONS

During the Workshop 13 Papers on the present situation of beekeeping in the respective countries were presented. These were followed by 10 technical papers and 6 presentations on the present status of a similar number of agro-forestry and/or environmental protection projects.

At different points in the Workshop, plenary sessions permitted ample debate and discussion on the respective papers. Rapporteurs were responsible for collecting and summarizing the conclusions and recommendations emanating from the plenary discussions.

On Wednesday morning a lengthy Plenary Session was dedicated to acting upon the first recommendation: "the formulation of a regional association of beekeepers".

The following represents a general consensus of opinion of Workshop participants as to problems, needs and recommended follow-up actions for the development of the beekeeping industry in the Eastern Caribbean.

CONCLUSIONS

1. Beekeeping has not been given serious attention or support by public sector planners/developers in most Eastern Caribbean States.

2. Beekeeping can make very positive contributions to the diversification effort by stimulating productivity, exports and import substitution.

3. The Eastern Caribbean islands have ample land areas suitable for the production of a wide variety of honey and hive products.

4. Legislation regarding the beekeeping industry exists in Trinidad and Tobago, Jamaica and Belize, but the Acts are quite varied. The most comprehensive Act is that of Trinidad and Tobago. The remaining islands have some laws which make reference to beekeeping but in general they are totally inadequate to meet the needs of the industry.

5. National organisations of beekeepers are either non-existent or very weak.

6. There is a need for strong organisations of beekeepers at the national level to facilitate training, exchange of information, equipment supply and marketing of hive products.

7. There is a need for a regional organisation of beekeepers to represent the region at international forums, promote common projective legislation, guide the systematic development of beekeeping in the interests of the region and facilitate training, exchange of information, research and marketing.

8. There are a large number of regional and international support organisations which can contribute technical and financial assistance and information towards the development of the beekeeping industry in the Caribbean.

9. There are a significant number of agro-forestry and environmental protection projects underway within the region. Most of these projects having either identified beekeeping or would like to integrate it as a complementary activity to their ongoing action. While beekeeping is recognised as an environmentally friendly activity, specific plans for beekeeping support actions are not clearly defined within the environmental protection projects.

10. The beekeeping industry should be kept in the hands of and controlled by local beekeepers. Proposals for joint operations with external entrepreneurs should be carefully reviewed, studied and discussed.

11. In general, the islands of the Eastern Caribbean, from Barbuda in the North to Grenada in the south, are free of major bee pests and disease problems, with the exception of Guadeloupe where European Foul Brood has been found.

12. Most beekeepers in the region are unfamiliar with the serious bee diseases and pests found elsewhere since the sub-region is basically pest/disease free.

13. Major diseases can be spread by feeding honey to bees. Beekeepers should therefore avoid feeding honey, left over honey on frames and cappings and, particularly, imported honey.

14. The only island in the Caribbean with Africanized honey bees is Trinidad. Since 1979, when they first arrived from Venezuela, they have not spread to Tobago due to the greater distance between the islands than that which separates Trinidad from Venezuela. Utmost efforts must be made to keep this highly defensive bee from expanding into any other island of the Caribbean.

15. The most likely method for the Africanized bee to spread from Trinidad and the Continent to Caribbean islands is by swarms hitch hiking on sea going ships and boats.

16. There tends to be a scarcity of technical expertise in apiculture in most islands and relatively few organised training events utilizing few experts available within the region.

17. The art of beekeeping is not highly developed in the Eastern Caribbean although there are a few beekeepers who apply high tech and obtain high levels of productivity. Most are part time beekeepers, small operators, and a few are hobbyists.

18. The organised use of bee colonies for cross-pollination of crops is not practised in most countries of the region, with the exception of Florida.

19. The principal nectar (honey) flow in most of the islands falls between December and July with a secondary flow August to October.

20. Most beekeepers are aware of the principal sources of nectar for their bees, however, there seems to be relatively little information and understanding of the advantages and disadvantages of diverse types of bee pasture.

21. Most colonies produce honey from a variety of nectar sources although there are some exceptions among larger producers who may specialise, e.g. logwood honey in Antigua.

22. The importation of some species of nectar sources, while beneficial to the beekeeping community can be detrimental to the agricultural sector in general, e.g. good bee pasture that may be considered weeds by farming community.

23. The islands have a very wide diversity of honey types, flavours and quality but no classification/grading system exists.

24. For the majority of beekeepers in the sub-region honey productivity is low, often falling between 50 and 120 lbs/hive/year.

25. One important cause of low productivity of honey production in the sub-region is the tendency to not requeen systematically. Young queens are much more productive than older queens. Poor management practices also contribute to low productivity.

26. Several beekeepers are aware of the proper technique for producing local queens, however, there is no commercial production of queens in any of the islands with the exception of the island of Vieques, Puerto Rico. This stimulates beekeepers to import queens from outside the region thus putting the industry at risk.

27. Bee stock on all our islands is considered by the experts to be of very good quality. It should not be jeopardized by importing new stock.

28. Bees have the ability to fly over 12 miles therefore any islands selected for commercial raising of queen bees should be over 12 miles distant from other islands.

29. In general, most beekeepers have difficulty in obtaining beekeeping equipment and materials.

30. The main source of beekeeping equipment in the islands is the USA. Some equipment, e.g. smokers, extractors, frames, boxes and others are produced on a small scale in Trinidad and Tobago and some other islands.

31. The high cost of imported wood and other materials is a serious constraint to local manufacture of beekeeping equipment.

32. Honey extraction is done using a variety of techniques. Most beekeepers use manually operated 2, 3, 4 and 6 frame tangential extractors.

33. Honey is the main hive product marketed. Several beekeepers sell bees wax for candles and batik making. Very few collect pollen or other hive products.

34. The present levels of honey production are insufficient to meet the local market demand in most countries of the Eastern Caribbean.

35. Market prices vary considerably between the islands for the same quantity of honey.

36. Quality of honey varies greatly between islands and between producers on the same island. In some cases the quality difference is due to source of nectar (colour and taste) and in others to poor handling practices and methods/materials used in packaging.

37. Packaging of honey varies greatly between the islands but most beekeepers continue to rely on re-cycled bottles.

38. All the islands would like to export their honey to regional markets where prices are more favourable than on the world market. Marketing studies and good planning will be required to avoid direct competition between suppliers.

39. Honey, beeswax and pollen are the three hive products which can most easily be commercialized by regional beekeepers.

RECOMMENDATIONS

1. A regional association of beekeepers should be formed immediately to coordinate/promote activities of common interest to beekeepers of the region. This organisation should be called the Caribbean Apicultural Development Association (CADA).

2. Decision makers at the national and regional level should consider beekeeping as an integral part of the diversification effort and provide the corresponding support needed for its development.

3. Legislation based on the Honeybee Pest and Disease Control Act model prepared by CADA should be implemented in all countries without such legislation. Efforts should be made to follow a common model.

4. Efforts should be made in each country to form some type of beekeepers association to coordinate basis services as deemed necessary by local beekeepers.

5. One of the functions of CADA should be to identify sources of regional and international technical and financial assistance and coordinate activities to access and utilize such resources.

6. Efforts should be made in each country to coordinate with Agro-forestry and Environmental Protection projects to promote the integration of beekeeping activities.

7. CADA should serve as a clearing house for dissemination of information and the organisation of regional training in beekeeping and the formulation and coordination of projects with a regional coverage.

8. CADA in coordination with IICA and the respective Ministries of Agriculture should promote the formulation of national legislation to protect the beekeeping industry.

9. A media campaign to inform the public and national decision makers of the danger of importing bee pests and diseases should be organised and executed throughout the region.

10. Training activities oriented towards increasing the productivity and sustainability of beekeeping should be organised on a regular basis in each country.

11. PADF should be requested to prepare a publication on trees, shrubs and other bee pasture best suited for the production of nectar and pollen in the Eastern Caribbean. Attention should be given to those plants which may be detrimental to the agricultural sector.

12. The University of Puerto Rico, Mayaguez, should be requested to take the lead in the development of a project to describe and classify the honey of the Eastern Caribbean.

13. Training of beekeepers in queen rearing and queen replacement should be given high priority.

14. CADA should be asked to take the lead in the identification of suitable locations and formulation of queen rearing projects to meet the national and regional needs for queens.

15. CADA should publish a circular/fact sheet on the dangers of importing queen bees.

16. CADA should take the lead in the identification of the most economically advantageous sources of beekeeping equipment and materials.

17. Beekeepers should make efforts to improve their methods of honey extraction and bottling so as to improve and standardize quality and presentation.

18. A study of the market for honey and hive products in the Eastern Caribbean and the supply and demand of honey, should be commissioned to generate information for planning the development of the beekeeping industry.

NOTES ON FINAL PLENARY SESSION

It was agreed by the Members of this Workshop that institutionalization of a Regional Body was required in order to better develop and protect our Apiculture Industry. Options for organizational structure considered were:

(a) Federation
(b) Company
(c) Corporation
(d) Association
(e) Society

After discussing the issue for some time it was decided that we would be best represented as an Association or a Society. A motion was put to the floor by Malcolm Sanford (Florida) and second by Maxwell Bhola (Grenada) to take it to a vote. By unanimous decision an Association was chosen over a Society.

A motion was then placed by Daniel Pesante (Puerto Rico) to open suggestions to adopt a name and Acronym for our Association. It was second by Rupert Gajadhar (Saint Lucia). The following names were suggested.

(1) Caribbean Apicultural Development Association (CADA)

(2) Caribbean Apicultural Development Cooperative Association (CADCA)

(3) Caribbean Apicultural Cooperative Association (CACA)

The first option Caribbean Apicultural Development Association (CADA) presented by Malcolm Sanford (Florida) was chosen as our official name over the other two options.

Option #1 - 28 votes, #2 - 5 votes; #3 - 0 votes

The floor was next asked if at this time we should elect a group of officials to represent this Association. The resulting vote showed:

21 votes in favour; 2 no's, and 8 abstentions

The number of officers that would constitute the Directive or Steering Committee was then voted for, among four options the following results obtained:

Officers	Votes
13	0
9	1
7	11
5	14

It was then decided to vote between the two options receiving the most votes. Two round-off votes were made between 5 and 7 officers with the following outcome.

Officers for the Steering Committee

1st Voting		2nd Voting	
Officers	Votes	Officers	Votes
5	17	5	27
7	16	7	6

The motion to open nominations to select the five officers that would head the Steering Committee was placed to the floor by Maurice Percival (Saint Lucia) and second by Bonaventure Anthony (Saint Lucia).

The list of candidates included:

Jorge Murillo-Yepes	(Grenada)
Rupert Gajadhar	(Saint Lucia)
Abudu Jaima	(Antigua)
M.K.I. Hallim	(Trinidad)
Daniel Pesante	(Puerto Rico)
Bernard Nichols	(Antigua)
Malcolm Sanford	(Florida)

A move to close nominations was accepted with all Aye's.

Each candidate gave a brief presentation on their involvement in Apiculture and on how they would represent the Association. Malcolm Sanford (Florida) asked that his name be withdrawn from the list as his present duties and responsibilities would not enable him to best represent the Association.

The six remaining candidates were asked to leave the room and voting took place with a show of hands for each person.

The Steering Committee elected was integrated by Jorge Murillo-Yepes, Rupert Gajadhar, Abudu Jaima, M.K.I. Hallim and Daniel Pesante. Bernard Nichols was selected as alternate in case anyone of the five should withdraw.

After an open discussion it was agreed by all members attending the Workshop that the first duty of the Steering Committee was to generate a document with the constitution and by-laws. This document is to be presented to the members of CADA at the Fifth International Conference on Apiculture in Tropical Climates to be held in Trinidad and Tobago, 7-12, September 1992.

The Steering Committee met and selected Abudu Jaima as Chairman of the Workshop to be held in Trinidad where the constitution/by-laws of CADA will be presented.

The Steering Committee decided not to elect any Officers at this point in time. In respect to follow-up activities the committee decided to:

1. Exchange information on models of constitutions and by-laws and prepare a proposal for constitution and by-laws for ratification at a Workshop meeting in Trinidad and Tobago;

2. Produce a quarterly newsletter to be edited by Daniel Pesante, University of Puerto Rico at Mayaguez, and circulated to all participants at this Workshop as well as other interested persons. The first newsletter will contain:

   a) an article on this Workshop,

   b) the formation of CADA and its objectives and the names of Steering Committee members and addresses,

   c) announcement of IBRA Trinidad and Tobago meeting.

3. Make arrangements with IBRA for time/space for Workshop meeting of CADA members in Trinidad and Tobago.

4. Organise a meeting of the Steering Committee during July or August, 1992. IICA will be requested to assist in the organisation of the meeting.

SECTION 2

COUNTRY PAPERS

BEEKEEPING IN ANTIGUA AND BARBUDA

By

Abudu S Jaima

The Eastern Caribbean Nations in general are characterized by subsistence farming and the production of a narrow range of export crops, such as bananas, sugar, spices, cocoa, citrus and copra. Presently, Antigua and Barbuda has no perennial export crop. Antigua's 1986-87 exports consisted primarily of short term crops such as melons, cucumber, green beans, tomatoes and sweet potatoes. These short term crops do not serve as ready sources of food supply for bees and therefore cause them to seek alternatives in the secondary woodlands. Despite the attempts at Land Reform and agricultural diversification, little emphasis has been placed on beekeeping or fruit tree crop production Api-Agro-Forestry. Agro-Forestry involves the production of fruit, fibre, fuel and wind breaks, as well as soil conservation and a necessary food supply for bee pollination and honey production.

Domestic food production in Antigua is still mainly in the hands of small producers and the large gap between supply and demand is met from regional and extra-regional imports paid for with the foreign exchange generated from tourism.

Antigua's population is estimated to be 62,000 but can increase by as much as 40% during the tourist season. This increase in population taxes our import requirements via the hotels. Antigua and Barbuda's White Paper Report on a Policy for Agriculture 1988-1992, states Antigua's current food import bill exceeds $70 million: This amount is three times as large as the current value of the total domestic crop and livestock production.

One of the solutions to this problem is an integrated system of inter-cropping, tree-cropping and beekeeping. Antigua and Barbuda is not suffering from high population concentration and therefore has significant areas of under utilized land, which may be suitable for integrated systems. We presently enjoy a disease free environment with regard to bees, as well as unpolluted airways and waterways. approximately 15,000 acres suitable for agricultural production are now laying fallow due to the breaking up of the sugar plantations. These areas can be managed into meaningful integrated food and fibre production units with maximized output and effective soil conservation.

Antigua is located 17 degrees north and 62 degrees west, belonging to the Leeward Island group of the Eastern Caribbean. We are considered tropical with an annual rainfall of 43 inches (1100 mm). Due to the primary land cover being shrubs and small trees, with the exception of a small rain forest, Antigua is susceptible to frequent drought. We feel that this condition can be meaningfully

altered by responsible planning of land cover that is multipurpose to satisfy the needs of the population, livestock, fuel, soil conservation and ecosystems that attract rain. The question of deforestation and/or decertification perpetuating drought is based on the theory that vegetation blankets the soil, retaining solar heat at night and releasing it during the day. Air containing moisture from plant condensation and transpiration rises during the day and condenses to form clouds, thus bringing rain. Island nations with small land masses add another dimension to the rain dynamic. Most of the condensation and transpiration occur over the water. The clouds are formed and then the wind transports them across the land mass. The increased humidity of the land vegetation creates an environment that causes precipitation.

We are cognizant of the importance and need of Antigua's agricultural and apicultural development as well as the growth of proper forestry. Our efforts in this area are not just for the present, while the world is grappling with insufficient food supplies, but insuring our food security in the future. It is in this view that we have focussed on Api-Agro-Forestry, or large-scale planting of perennial fruit bearing trees indigenous to the Caribbean.

Perennials offer many advantages in multi-crop systems where annual crops would soon exhaust the available nutrients without substantial fertilization. They can sustain the high level of continuous productivity. Trees accumulate large quantities of nutrients over the years and their extensive root systems are able to take advantage of soil moisture and nutrients. Trees also recycle their decayed products from the upper soil layers. They use only a small fraction of their nutrient supply to produce a heavy crop of fruit and nuts.

We recommend the three-tiered crop canopy system in which a mixture of crop species provide shade, privacy, dietary variety, fuel, building materials and a cash crop.

Apiculture plays a very important role in the maintenance of multi-crops, as much as 90% of all crops and flowers are dependent upon bee pollination. The placing of interspersed pollinator varieties of the crops throughout the orchards, as well as strategically placed bee colonies will greatly enhance the entire crop. Six to ten colonies per acre not only enhance fruit production and bring about a more efficient pollination of the orchard, but also allow us to specialize our West Indian honey to the particular species of tree. Our target crops are orange, tangerine, lime, grapefruit, mandarin, avocado, mango, banana, cashew, papaya, coconut, pineapple and guava. Hive products to be produced will include honey, pollen and royal jelly.

While these plants are good sources of honey production, Antigua's secondary woodlands consist of:

Acacia farnesiana	*(Cassie)*
Avicennia germinans	*(Black Mangrove)*
Bidens pilosa	*(Daisy)*
Haematoxylum campechianum	*(Log Wood)*
Laguncularia racemosa Gaertn	*(White Mangrove)*

Melicoccus bijugatus	*(Ginip)*
Persea americana	*(Avocado)*
Prosopis chilensis	*(Mesquite)*
(Molina) stuntz	
Stachytarpheta jamaicensis	*(Vervine)*

This vegetation offers a secondary food source and supports the numerous wild bee colonies throughout the island.

Our method of increasing bee population is by capturing wild hives from old buildings, rocks, caves, trees and swarms. Our early developmental focus was on the Kenya top bar hive; however, this method was not economical. They were difficult to manage and did not offer uniformity of frames or equipment. We have since adopted the standard Langstroth equipment, which allows large scale management. The foundation of this system is moveable frames, interchanging parts and hive rotation for available blooms.

The production of West Indian honey is a viable industry in Antigua. The large tourist industry, coupled with the domestic consumption, finds our production far below local demand. We are working to increase our number of hives with a view towards satisfying the local market. We have also established a honey bank (cooperative) as a marketing strategy in which 80% of the keepers are participating. We are currently processing approximately 27,000 pounds of honey per annum and are projecting 120,000 pounds towards the end of 1996.

Managed crop pollination is in its infancy, primarily because of the lack of agricultural development. Further development of tree cropping/beekeeping (Api-Agro-Forestry) should help to develop pollination as a means of increasing productivity and a viable enterprise in its own right.

Wax production has proved to be fruitful in as much as we produce a complete line of cosmetics, herbal creams and medicinals with honey and beeswax as the base. We market them both locally and regionally with a very good response.

Antigua has no bee disease and is free of the Africanized honey bee. These conditions make the potential for a queen rearing enterprise very attractive and could lead to a significant export market. Presently, we are increasing our expertise in this area with strong consideration being given to the crisis of Africanized bee invasions of the United States of America. The incursion of the Africanized bee outside the OECS sub-region would seem to offer this area a distinct comparative advantage in the development of beekeeping activities.

We have three nectar flows in March, June and December. The main source of supplies and equipment is the USA. There are 45 - 50 beekeepers on the island and probably 50 honey hunters. For the most part, we utilize the Deep Box Langstroth system. There are only two extractors on the island and therefore, production is severely hampered. Our colonies are producing approximately 180 lbs per year in three yields. Imports consist of bee equipment and honey. Our bee by-products consist of honey, herbal cream, candles and wax which are marketed locally through supermarkets, hotels and gift shops.

Major problems and constraints are:

(i) There are no bee organizations in place and none planned, and
(ii) there is a severe equipment shortage and difficulty in acquiring same because of foreign exchange requirements.

Special projects include establishing training workshops and producing a bee documentary as a training and educational aid.

The implementation of our strategies requires Government to redress its priorities to world food security. We are in need of long-term capital investment and secure land tenure arrangements that allow our young people to look to agriculture as our future. We need coordinated planning and improved project preparation, implementation and management. We must align ourselves with international research institutions such as IBRA (International Bee Research Association), National Research Agencies of Governments, universities and foundations to greater enhance our methodology of beekeeping in integrated Rural Development programmes. Technical training must be expanded and upgraded to include the latest techniques of our craft. Finally, we must begin the social education process of our people. Informing them of the importance not only of feeding ourselves, but also the interdependence of bees and crops.

The land of milk and honey is the land of independence.

BEEKEEPING IN BARBADOS

by

Vernon Neblett

Ladies and Gentlemen, it is an honour for me and my colleague, Mr. Roy Went, a practising beekeeper of many years experience, to be here to represent our country Barbados at this First Regional Training Workshop of Beekeepers.

Barbados is a small country of one hundred and sixty-six (166) square miles with a population of approximately 258,000. It is the most easterly of the West Indian Islands.

Barbados is for the most part a flat country with its highest peak, Mount Hillaby standing at 1,145 ft. The island is divided into two distinct geological regions. To the Leeward, there is the coral limestone area composed of a series of gently sloping, step-like terraces covering the major part of the island. To the Windward there are the steep, broken slopes of the sedimentary Scotland District. This accounts for one-seventh (1/7) of the island. Our island resource is limited since only approximately 21,000 ha is arable.

We are largely an agricultural and tourist economy. Rainfall averages sixty inches (1538mm) per year. The dry season starts from December and continues through to June, the rainy season is from July to November.

Barbados has about eleven percent (11%) of its people involved in agriculture. Our chief crop is sugarcane which in recent years has been on the decline. There is now an effort to diversify with emphasis being placed on cut flowers, fruits and cotton. Our principal export crop is still sugar with cotton, root crops and cut flowers playing a supporting role.

The importance of the hotel industry cannot be over emphasized. It is our greatest foreign exchange earner at present and it is well equipped to cover the needs of tourists. Barbados has seventy-two (72) hotels and fifty-three (53) apartments (Barbados Board of Tourism). Hotel bed occupancy rate at the end of December 1991 stood at approximately 48.2 percent and the hotel room occupancy rate for the same period stood at 50.5 percent.

Although beekeeping has been practised for a number of years in its modern form, by a few individuals, it has never generated the interest of other forms of agriculture. It was never thought of as commercially viable and throughout the years was only looked upon as a useful hobby. This attitude is changing somewhat and with the recent economic squeeze people are trying to supplement their earnings.

The Ministry of Agriculture, Food and Fisheries has been trying to encourage apiculture for a number of years. Mr. Vernon Neblett was sent to Israel to be trained as a beekeeper and Mr. Hewley Watson attended a two week

seminar in Ohio. The purpose of the Ministry's Bee Project, as it is known, was firstly to reduce the amount of honey imported into Barbados so as to decrease losses of foreign exchange. Secondly it was to encourage farmers, groups, clubs and others with an interest to become part of the developing Bee Industry. Extension Services were provided in placing hives on farmers' lands to assist them in crop pollination, services were also given in assisting beginners with starter hives (nuclei) and the duty on imported equipment was waived. At present the Ministry is still assisting the general public by giving advice on beekeeping, in correcting problems encountered with bees and in solving problems of a technical nature.

An attempt was made to form Barbados Beekeepers Association, however, to date this association is dormant due to a lack of sufficient members. The resuscitation of this group is being considered and the appropriate action will be taken to make sure that such an association begins to function.

There are two main nectar flows in Barbados. The first flow is during the month of April and the second around June. Barbados has no large acreage of orchards. The preferred flowers are from the ackee tree (referred to as genip in other Caribbean countries). This gives us our early honey, supported by the nectar from mahogany trees. Our later honey is primarily a mixture of nectar from wild flowers such as dunks and coralita. The coralita is a vine which gives pink flowers and is wide spread across the island, it can be seen in bloom almost throughout the year.

Beekeeping in the island is undertaken by about twelve (12) persons with an estimated two hundred (200) hives, that is an average of seventeen (17) hives per person. However, most of these hives are kept by five (5) beekeepers. The others are persons who have hives on their property which are looked after by other beekeepers.

As our honey flow is short we use mainly shallow supers. Honey extraction is done with the use of a honey extractor. Our bees are kept in Langstroth type hives. Honey production is about thirty (30) pounds per hive with an average of six thousand (6,000) pounds per year, all depending on the floral bloom. There has been no study done on the cost of production of honey. All of our honey is being sold directly to the local consumer from the beekeeper.

Barbados imports approximately 28,286 kg of honey (Ministry of Agriculture) of which 784 kg comes from the United Kingdom, 1,922 kg from Canada, 480 kg from Argentina and 25,100 kg from the United States of America at a cost of BDS$132,481.00. This is too much foreign exchange leaving the country unnecessarily. This is why, as was earlier said, that we want to reduce that amount considerably and keep our foreign currency. The other hive product sold is bees wax. This wax is sold on the local market. Royal jelly is imported, for use in various nutritional foods provided by the nutrition outlets.

Our bee supplies and equipment are usually imported from the USA and sold by a leading firm, namely Plantations Trading Co Ltd. There is one new entrant into the market who brings in equipment.

Some beekeepers are at present constructing their own hive bodies and frames. But this can be costly if done with hired labour. The main demand is for wax foundation and frames annually.

Barbados still has a long way to go in the development of its Bee Industry. At present financial support is limited to those actions that are absolutely necessary to assist in the development of the country and we think beekeeping is of some importance in this regard. We would like to be in a position to develop our industry to the point where we can produce and breed queens, produce other by-products and most of all produce our own equipment. In our view beekeeping is here to stay, farmers depend on it and we beekeepers depend on the farmers.

BEES AND BEEKEEPING IN DOMINICA

By

Errol Harris

Background Information

The Commonwealth of Dominica, the largest of the Windward Islands, is located in the center of the Lesser Antilles in the Caribbean sea, between the French islands of Martinique and Guadeloupe, and forms part of the Organisation of Eastern Caribbean States. The population at the 1991 census was 75,000 of which approximately 20 percent is involved in agriculture.

Dominica's total land area is 751 square kilometers and its highest peak, Morne Diablotins, is 1,447 meters. The terrain is very rugged, traversed by some 365 rivers.

Dominica has three high elevation fresh water lakes. The boiling Lake is the third largest hot water lake in the world and the cold water lakes are called Fresh Water Lake and Boeri Lake.

Monthly rainfall is abundant, ranging from 74mm in the driest parts to 274mm at the higher elevations. The drier months are usually January to March while July is usually the wettest. The vegetation varies from dense tropical forest to scrub along the west coast. Bee pasture is best along the west coast and fringe areas along the east coast, while seasonal forage for citrus is available in the interior. There is substantial acreage of scrub land along the west coast that could be developed into bee pasture.

Major crops grown in Dominica are bananas, coconuts, citrus, grapefruit, oranges, limes. Minor crops include avocado pears, passion fruit, cocoa, coffee, various spices, root crops and an assortment of tree crops.

The Division of Agriculture has used Peace Corps Volunteers over the past 15 years to work with beekeepers throughout the island. They have often individually done quite well but continuity has been poor from one volunteer to his successor. The last major effort was the organisation of an association of beekeepers which received Heifer Project assistance to set up an equipment fund. The organisation incurred debts on their imported equipment and eventually, allowed the organisation to die while the members were still in debt to the organisation.

To date there has been no planned link to agro-forestry and the protection of the environment, a matter that the conservation society sees as paramount to the future of the industry. There are proposals underway to attract European involvement in the production and support for the bee industry, a development that must be carefully supervised to protect local entrepreneurs.

There are 533 hotel rooms on the island with serious government efforts being made towards tourism.

Present Status of Beekeeping Industry

Detail catalogued information is not available on honey flows in Dominica, however, December to late July is the period of greatest harvest of honey. In Dominica the heavy and prolonged rainfall can wash out a good nectar flow. For instance, in July the forest tree "Savonette" (a leguminous flowering tree with blue flowers) flowers in great profusion and produces a beautiful thin clear honey, but in at least two years out of three, all the nectar is washed out and there is no harvest worth extracting.

The nectar flow in December is generally small and stimulates the hive to build up the bee worker population for the coming season. Coconut trees flower all year round while several other trees flower over rather short periods. There is a tremendous amount of work to be done in Dominica on the cataloguing of the bee pasture.

Bee supplies are at present imported by individual bee keepers. There was an effort to unify Beekeepers some five to six years ago. This group started ordering their supplies privately, boycotting the local business house which had been importing the necessary equipment for over thirty years. There is limited local production of hive boxes, frames and wax foundation.

The following equipment and materials are required to support the beekeeping industry in Dominica:

Bottom boards

Hive covers	-	inner covers
	-	outer covers
Boxes	-	brood chamber boxes
	-	shallow supers
Frames	-	deep frames
	-	shallow frames
Foundation	-	deep wired
	-	deep
	-	shallow wired
	-	shallow
Bee veils	-	30
Bee gloves	-	20 pairs
Hive tools	-	20
Smokers	-	30
Division board feeders	-	50
Boardman feeders	-	50
Jars		
other inputs		

Fumigant for stacked supers "Para-Moth"

To satisfy maintenance with a 10% increase in hives would require annually: about 30% of present 600 hives with double brood chamber, two deep supers and one shallow super per hive.

There are about 20 active beekeepers on the island but well over 50 to 75 trained individuals in beekeeping. There are approximately 600 maintained commercial hive colonies and well in excess of 1,000 wild hives on the island.

Most beekeepers use deep supers though there are a fair number of shallow supers in use. It is quite likely that shallow supers are better for collecting honey from individual trees because of the short flows from any one plant species.

Most beekeepers in Dominica may be regarded as hobbyists, who spend little time on their hives, do not control swarming and do not prepare their hives for the honey flow by feeding. Most honey is extracted using two to six frame extractors. There are no figures available on the cost of production or the extraction of honey. Apart from honey sales, wax is also sold for batik work and a few other uses.

Present Markets

All hive products are sold either on the island or in the neighbouring French islands. Most honey is packaged in recycled beer bottles though there are, on the market, standard 8 oz honey bottles left over from the dormant beekeepers organisation. Marketing can often be quite frustrating and at times some beekeepers cannot sell their honey. There is an absence of laws to control bee products, though this is controlled by the Division of Agriculture using inappropriate legislation.

Major Problems

There is an absence of a functioning beekeepers organisation. Full use is not made of the early part of the honey flow because the hives are not fed and strengthened before the flower season. Bees are often permitted to swarm leading to a loss of production. Swarms are used to increase numbers and hence genetically bred towards poor quality bees.

Few if any quality queens are produced on the island. Quite often queens are produced from small and comparatively weak hives. Extraction is often done when time permits and honey from several tree species get mixed into one.

Wax is often of poor quality due to remnants of honey, being burnt or dark in colour due to contamination with bee glue (propolis).

BEEKEEPING IN FLORIDA

By

Malcolm T. Sanford

Introduction

The State of Florida considers itself part of the Caribbean by virtue of its location. Most of the state is a peninsula and, therefore, exhibits some differences from island nations. Nevertheless, Florida is a major stopover for vacationers and the Orlando to Key West area is arguably an integral part of the Caribbean basin tourist agricultural economy.

Three separate ecological regions are present in Florida: a northern temperate zone, a central subtropical zone and the southern peninsula, approaching true tropical conditions. Major crops of significance to the Caribbean economy produced in the state are sugar, several varieties of tropical fruits and livestock. Agriculture, agribusiness and tourism are the major economic activities in the State.

The Beekeeping Industry

Of the 2 million or so persons that inhabit Florida, about 10,000 are beekeepers. A mix of beekeeping experience exists, ranging from beginners with a single colony to one individual who manages more than 60,000 hives. Of the total number of beekeepers in the state, fewer than 500 can be considered full-time producers. Collectively these full-time apiarists manage the majority of the 220,000 colonies found in the state. The major activities in beekeeping at present are honey production and commercial pollination. As many as 100,000 colonies may move from Florida each year for commerical pollination in the northeast and/or honey production in the midwestern U.S. Queen and package bees were once a much larger industry in Florida and may become so again. There is minor activity in producing royal jelly, propolis and bee-collected pollen. The state also supports one major beekeeping supply warehouse and several small supply manufacturers. Allied industries involve production of beeswax foundation and other miscellaneous beekeeping materials (e.g. honey jars).

Honey Production and Pricing

The Florida honey crop is about 3 million pounds annually, produced from a variety of plants. The average yield per colony varies greatly from year to year depending on the type of nectar collected. Estimates range from 20 to 80 pounds surplus honey per colony per year. The typical Florida hive consists of a bottom board, a single standard Langstroth brood chamber separated from a shallow super by a queen excluder, and a simple cover of plywood. Double brood nests are rare. Honey is produced in full or shallow supers and the bees are usually removed by fume boards. Most large-scale beekeepers keep four colonies together on pallets which are manipulated by fork lifts. Beekeepers usually move colonies once to twice a year to maximize honey crops.

Perhaps most valuable honeys in Florida come from citrus in the south central part of the state and tupelo (Nyassa ogeche), locally produced in the Apalachee River basin. Other plants of importance are black mangrove, cabbage palm, gallberry, saw palmetto and sea grape.[7]

Cost increases in beekeeping have traditionally outstripped prices. Over the last decade, honey prices have averaged from U.S. $0.40 to $0.60 per pound, depending on market prices and governmental subsidies. Many beekeepers sell honey retail at about U.S. $1.20 per pound and some premium crops/packs may get U.S. $2.00 per pound. Most sell liquid honey with a sprinkling of chunk and comb honey for the tourist trade. Beekeepers may sell honey wholesale in fifty-five gallon drums or retail through roadside markets in grocery stores. Most honey sold in the U.S. is bought in supermarkets.

Two programs have had major influences on U.S. honey marketing over the last decade. The first in the U.S. Government's Honey Loan Program. Defaulted loans became a federal subsidy in the early 1980s when the government literally acquired almost half of the total U.S. honey crop (220 million pounds) at the expense of cheaper foreign honey (mainly from Mexico and China). Subsequent innovative pricing (a subsidy) and short worldwide honey crops have emptied government warehouses, but the loan program still represents a subsidy to the beekeeper of about 20% of world market price in most year.

In the mid 1980s, the beekeeping industry ratified the Honey Research, Promotion and Consumer Information Bill. Under this legislation, producers of 6,000 lbs or more assess themselves U.S. 1.0 cent per pound which is given to the National Honey Board for research and promotional activities. The legislation was recently voted to be continued by the industry and most agree the Honey Board's activities have been important in stabilizing if not increasing honey prices and stimulating demand. The Board has concentrated on programs which emphasize honey as an industrial commodity.[8]

Problems and Constraints

Several problems have been associated with environmental conflicts between beekeepers and the general public in Florida. These disputes affect beekeeping because all plants except citrus are wild and access to them is often not controlled primarily by beekeepers.

Most nectar sources are native to the state, but two introduced species have become important over the last three decades. These are punk, sometimes called melaleuca (Melalaeuca quinquenervia) and Brazilian pepper (Shinus

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[7]A full catalog of plants important to bees in Florida can be found in Florida Bee Botany, Florida Cooperative Extension Service Circular 686, 1988, 15. pp.

[8]For information, contact the National Honey Board, 421 21st Ave., Suite 203, Longmont, CO 80501-1421, ph 303/776-2337.

terebinthifolius). Although valuable for bees because they produce honey several times per year (mostly in the fall) when other sources are not blooming, these plants are termed "noxious weeds" by most residents for a number of reasons. Efforts to eradicate or control the spread of these species in the state have been opposed by the beekeeping community. This suggests that importing species for ornamental value or nectar production is not necessarily a desirable strategy in many cases. It is a practice agriculturists on Caribbean islands should be wary of.

Intense urbanization and large-scale land clearing for agricultural purposes affects beekeeping by reducing the amount of natural vegetation available to beekeepers. As a result, beekeepers become squeezed onto more marginal land and in the process their colonies become prone to predation by black bear, a protected mammal in Florida. Beyond bears, there also continues to be conflict between beekeepers who actively solicit locations in parks and preserves and public land managers, many of whom look at the honey bee as an introduced species that outcompetes and may eliminate native insect fauna. In future, more locations are expected to be lost as over defensive Africanized bees invade the state from the west.

Besides a reduction in a number of beekeeping locations, the introduction of tracheal mites in 1984 and Varroa in 1987 has proved costly to the Florida beekeeping industry. These events are responsible for drastic decline in queen and package production. In addition, they add to management costs which are difficult to compensate for when the honey prices remain stable. Although many in the state are ignoring tracheal mite infestations, this is impossible with Varroa. The use and potential misuse of pesticides to control the latter parasite represent a large variable in present and future honey marketing efforts. The fact that honey is perceived as an "organic" food by most consumers, while at the same time beekeepers are using pesticides inside a living colony to control mites, is an irony of modern Florida beekeeping that cannot be ignored.

Beekeeping Associations

Traditionally, Florida has had strong leadership in its beekeeping associations. The Florida State Beekeepers Association holds an annual meeting to which delegates from a dozen or so local associations attend. The Association lobbies for beekeeping interests at the local level, often in concert with national beekeeping Associations.[9]

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[9]For information, contact Ms. Eloise Cutts, Executive-Secy., Florida State Beekeepers Association, 2237 NW 16th Ave., Gainesville, FL 32605. ph 904/378-7719; Troy Fore, Jr., Executive-Secy., American Beekeeping Federation, P.O. Box 1038, Jesup, GA 31545, ph 912/427-4018; Dr Lawrence Conner, Executive-Secy., American Honey Producers Association, P.O. Box 817, Chesire, CT 06410, ph 202/150-7575.

Governmental Assistance

Florida beekeepers are fortunate to have the assistance of several governmental agencies. The Florida Department of Agriculture and Consumer Services maintain one of the largest and most comprehensive bee inspection programs in the nation. Some 12 full-time inspectors are available to monitor outbreaks of foulbrood and mites, recommend treatment and compensate beekeepers for losses due to American foulbrood. The Department's bee inspection and public relations services are also expected to materially aid the industry when the Africanized honey bee invades the state.[10] As part of this effort, the state has recently adopted a beekeeper registration program which incorporates a modest fee.

Acting in concert with the bee inspection service, the Florida Cooperative Extension Service employs one full-time apiculturist. The cornerstone of this program is a monthly newsletter provided free to beekeepers in the state and now available worldwide through the Bitnet and Internet computer networks. In addition, the Extension Apiculturist also provides management advice through written materials, video productions and a Beekeepers Institute held in August most years.

[10]For information, contact Mr. Laurence Cutts, Chief Apiary Inspector, Apiary Bureau, Division of Plant Industry, P.O. Box 147100, Gainesville, FL 32614-7100, ph 905/372-3505, Ext. 128.

BEEKEEPING IN GRENADA

By

Augustine S Vesprey

Introduction

The Tri-island state of Grenada, Carriacou and Petit Martinique covers an area of 133 square miles (84,420 acres).

The island of Grenada where the honeybee is found has a land area of 122 square miles (75,370 acres). Grenada, which is 21 miles at its greatest length and 12 miles at its greatest width, has as its most dominant topographical feature, a central mountain mass which itself is broken up into numerous peaks and valleys - the highest peak is Mt. St. Catherine (2756 ft) to the north. There are also four (4) significant peaks at heights of 2512, 2412, 2347 and 2300 ft. At the coast the area forms a coastal belt of low undulating plains, mainly on the east and south coast. In the west, mountainous outcrops extend to the sea and there is a very narrow coastal line.

Approximately 50% of the total area of the island is more than 500 ft above sea level. This mountainous terrain in such relatively small acreage results in two very important features:-

(a) Significant climatic difference throughout the island - agro-ecological low, middle and upper belts. Also this climatic feature gives rise to the possibility of crops not usually association with a tropical climate. The middle and lower belt is very good bee pasture. The upper belt gives poorer quality high humidity honey.

(b) A high proportion of comparatively steep slopes - 19% of total acreage is 10-20 degrees; 46% between 20-30 and 23% over 30 degrees slope.

The Tri-island state is estimated to have a population of 91,000 people. The 1980 census puts the agricultural population at 8,202 farm households with an average of 5 persons per farm, giving an agricultural population of 41,10 persons.

The major crops produced are bananas, cocoa, nutmeg and mace for export. These traditional cash crops account for about 17% of the GDP. In recent times the depressed prices for the traditional crops are changing the focus to non-traditional crops (mango, breadfruit, golden apples, sugar apples etc.).

Present Status of Beekeeping Industry

The island of Grenada has two main honey flows per year. The first and heavy flow is from February to May and the second and light flow is from August to November.

There are some 25 Beekeepers and another 25 Honey Hunters on the island of Grenada. There are about 3 full-time Beekeepers with the remainder rearing bees as a hobby. The total number of colonies in Grenada is estimated at 500 (both wild colonies and "cultured" hives). There is a national average of 20 colonies per Beekeeper. Beekeepers use both deep and shallow supers. The Langstroth hive technique is the present state of the art used by Beekeepers.

The main sources of bee supplies and equipment is from the Kelly, Dadant, Maxant and Glory-bee companies of the USA.

The main source of nectar supply include coconut, mango, mahogany, guava, avocado, imortelle, hog plum, gliricidia, citrus, cucurbits, logwood, tamarind etc.

The extraction of honey is done by the use of extractors, in some cases, and by the traditional (compressed by hand) method in others. There are approximately four (4) extractions per year. It is estimated that Grenada produce some 20,000 lbs of honey per year (approximately 1,700 gallons) giving a national average of 40 lbs of honey per hive per annum. Other hive products are wax, pollen and propolis.

There are a few Beekeepers with an estimated 100 lbs of honey per hive per extraction.

Present Markets for Hive Products

The island of Grenada imports a small quantity of extracted "Grade A" honey.

Local honey is sold in supermarkets and retail outlets. The consumer prefers honey which is amber in colour. Honey is sold in 300 ml and 750 ml bottles at EC$5.00 and EC$10.00 respectively.

It is estimated that the present local market is saturated and additional production must be channelled to regional and extra-regional markets. There seems to be a good market in Barbados and other OECS countries.

Major Problems

The major problems suffered by Grenadian Beekeepers are:

- lack of functional institutional organisation;
- lack of adequate machinery for extraction;
- inadequate packaging and transportation to regional and extra-regional markets, and
- the wax moth continues to be the most notorious pest and disease problem.

The writer is unaware of any special project or activity being undertaken at this present time to treat these problems.

BEEKEEPING IN GUADELOUPE

By

Marcel Rupaire

General Data about Guadeloupe

Guadeloupe is an archipelago which includes two main islands separated by a narrow sea channel (Riviere salee). La Basse-Terre is mountainous with volcanic or acid soils (950 km^2 or 590 sq ml). Grande-Terre is calcareous and flat (570 km^2 or 200 sq ml). The close dependencies (located at less than 20 km or 12 miles from the two main islands) are the archipelago of Les Saintes (15 km^2 or 6 sq ml), Desirade (20 km^2 or 85 sq ml) and Marie-Galante (158 km^2 or 61 sq ml). To the North of Guadeloupe are the French part of Saint Martin (50 km^2 or 19 sq ml) and Saint-Barthelemy (25 km^2 or 10 sq ml).

About 710 km^2 (or 274 sq ml) of Guadeloupe is covered by forests. The used agricultural surface is about 560 km^2 (216 sq ml).

The population of the archipelago is 387,000 inhabitants. The agricultural active population was about 66,000 persons in 1990. Of the active population, 11% is employed in agriculture; 18% in industry (agro-industry, building and public works); 71% in tertiary activities (trade, tourism and services). The public sector represents 32% of the paid workers.

Production of selected agricultural crops is presented below:

Agricultural production	1987	1990
Bananas	145 599mt	95 452mt
Sugarcane	745 225mt	369 530mt
Exported sugar	53 835mt	55 112mt
Exported bananas	120 599mt	75 452mt
Tuber crops		22 365mt
Vegetables		29 971mt

Tourism industry

With an average of 300,000 tourists during the last three years (354,000 in 1988), tourism has taken a very important place in the Guadeloupean economy.

Its growth is presently limited by an insufficient lodging capacity.

The standard tourism hotels can only offer 2,550 rooms in "continental" Guadeloupe and 2,340 rooms in the northern islands (1989). A complement of 2,000 rooms is provided by other lodging resources.

This sector employs 2,500 people in the hotel industry and creates 500 indirect jobs.

Present Situation of the Beekeeping Industry

Modern beekeeping is recent, dating from around 1980.

There are three main flowering periods: flowers of campeche *(Haematoxcylon campechianum)*, tendre a caillou *(Acacia muricata)*, pomme-surette *(Ziziphum mauritiana)*.

There are other lesser flowerings which vary with the area: surio *(Dunalia arborescens)*, pois doux *(Inga ingoides)*.

Campeche and pomme-surette are mainly located in Grande Terre, tendre a caillou is common on the Leeward coast of Basse Terrre.

Campeche flowers in January-February, pomme-surette between July and September and tendre a caillou in May-June.

There are about 200 beekeepers in Guadeloupe.

Beekeeping equipment is imported, mainly from France, Canada and the USA, and is generally used for a period of five years. Only wax comb-foundations and small equipment are regularly ordered. Most of the beekeepers make their own hives.

There are about 8,000 hives of bees on Guadeloupe of which 5,000 are regularly exploited. The average number is 40 hives per beekeeper. About 10 professional beekeepers exploit 3,000 hives. The most frequently used hive types are Langstroth and Dadant, and often in a complementary way (super hives).

Various harvesting techniques are used. For wild picking and traditional hives "bwa fouye" (carved wood), the honey is manually harvested and pressed. In the case of framed hives; motorized extraction is used.

Production costs are very high in the Guadeloupean socio-economic context, averaging 40FF per kilogram or US$3 per pound.

Local annual production is about 100 metric tonnes (after hurricane Hugo, September 1989).

Average production per hive is about 20 kilograms per year. Honey is the only hive product. The others are not exploited in any significant amounts.

Present Markets for Hive Products

Imported honey comes mainly from France, the EEC, USA (Florida), and the Dominican Republic. There is also unofficial importation (smuggling).

In 1990, 41 metric tonnes of honey were officially imported. This dropped to 32 mt in 1991. CIF price was equivalent to 17.63 FF/KG or US$1.37/1b.

Honey is sold by supermarkets, wholesale dealers, and market vendors. The local honey is preferred and more frequently purchased although it is more expensive (50FF per kilogram or US$ 3.90 per 1b).

Honey is sold by the litre (1.5kg) from most vendors and in shops in 250 and 500 gram glass jars.

Consumers demand a pure, tasty, natural product.

Possible means of increasing sales include: (a) a better organisation of professional producers; (b) an import control policy, and (c) improved honey processing and packaging.

Principal Problems and Constraints

The main problems which have been identified are:

- Weak organisation among producers because of inability to reach agreement on actions.
- Public authorities do not consider beekeeping a promising activity.
- After hurricane Hugo, 50% of the bee population died because of inexperience of the beekeepers on how to deal with such disasters. Guadeloupean beekeepers wish to learn from their Caribbean colleagues, how to deal with such disasters.
- Deforestation is another problem, but the National Office for Forests (Office National des Forets) is working on the establishment of tree wind breakers as an economic measure to improve the life of flora and fauna in the country, eg this will provide bees with more honey gathering resources.
- Problems caused by the use of agricultural pesticides and for mosquito control.
- Sanitation problems: since hurricane Hugo, several cases of European foul-brood have been observed. Sampling was done by the Veterinary Services and the infected hives were treated. Guadeloupean beekeepers would like to see the establishment of a cooperative mechanism for the sharing of information on bee sanitation.

Projects In-the-Pipeline

Cooperative Guadeloupeenne de Miel (COGUAMIEL) has two main projects in the planning stage:

1) Processing of hydromel.

   - Project Manager: Philippe Belair (COGUAMIEL)

- Objective: to develop a processed honey product for the local market and to increase local honey consumption.

- Planned Production: 10,000 litres per year. 4 metric tonnes will be initially imported for this purpose.

2) Queen production.

- Project Manager: Marcel Rupaire (COGUAMIEL).

- Objective: to produce quality queens from Italian strains. This project will be established on an island uninhabited by bees. In the first phase, local beekeepers will benefit from an alternative to importing queens. Exportation of queens will be possible in a second phase.

ACKNOWLEDGEMENTS

- To Maurice Anselme (Parc National de la Guadeloupe) for his comments on the need for better organisation of Guadeloupean beekeepers.

- To Claude Raynaud (Office National des Forets) for information on the reforestation programme (partially presented in this paper).

English translation by Rodrigue Aristide

BEEKEEPING IN MARTINIQUE

By

Christian Palin

General Data about Martinique

Martinique is one of the volcanic Caribbean islands. It is 80 kms (32 miles) long, and 30 kms (12 miles) wide with an area of 1100 square kms. The terrain is mountainous in the north where the highest point is Mt Pelee (1397 m). The plain of Lamentin spreads south from the centre of the island.

The Rainfall is about 150 mm a month with differences of 47 mm in June to 477 mm in November.

In March of 1990, the population census recorded 359,570 inhabitants, up from 328,560 in 1982, yielding a 9,4% increase. The capital, Fort de France, has 100,663 inhabitants. Constitutionally, Martinique has been a French Department since March 19, 1946 and a District since September 5, 1973.

Most of the resources of Martinique come from tourism, commerce and agriculture. The hotel trade is very important with some 3,333 rooms in hotels of all types.

The tourist sector is growing rapidly making considerable gains since 1982. Directly or indirectly, it effects, about 8% of the work force.

The fishing industry (mainly artisanal) supplies up to 5,000 tonnes per year, representing 50% of total consumption (10,000 mt). The agricultural land area is 37,200 hectares, representing 30% of the total land area. There are about 16,000 farms employing more than 35,000 persons.

Total agricultural production reached 1,517 million francs (253 Million US$) in 1989. This included 8,200 hectares of bananas, 3,830 ha of fruits and vegetables and 3,073 ha of sugarcane.

Agricultural exports represent 60 to 65% of total exports.

Beekeeping Industry

Because of the diversity of vegetation, regions and weather in Martinique, the number of harvests can be from one to six per year. The period of harvest begins in January and ends in the middle of July.

The principal "honey-making plants" are:

Common Name	Scientific Name
Campeche	*Haematoxylom campechianum*
Acacia	*Acacia tortuosa*
Acomat	*Homalium racemosum*
Ti-Baume	*Croton flavens*
Gliricidia	*Gliricidia sepium*
Avocat	*Persea americana*
Manglier	*Laguncularia racemosa*
Manguier	*Mangifera indica*
Cotelette	*Citharexylum fruticosum*

The honey market in Martinique is the subject of very few studies. Work is presently underway to determine the marketing channels and key participants. The results will help beekeepers to evaluate consumer tastes.

There are three sources used by beekeepers to obtain beekeeping equipment and supplies:

a) There is a small shop for beekeeping equipment and material managed by a beekeeper.

b) Some pet shops sell selected supplies.

c) Many beekeepers buy their materials directly from Paris.

There are approximately 120 beekeepers in Martinique (92 declarations at the veterinary authorities) with a minimum of 4,800 hives distributed as follows:

- 10 beekeepers with more than 100 hives, producing a total of 68 - 75,000 kg
- 80 " " 15 to 100 " " " " " " 45,000 kg
- 20 to 50 " " less than 15 " " " " " " 13,000 kg

This gives a yield of approximately 133,000 kg of honey annually, produced by 126 beekeepers.

Four beekeepers are professionals with 300 hives or more each.

The honey production for one hive can range between 10 and 65 kg.

Plants such as Manglier (Mangrove) or Acomat can produce very large amounts of honey.

Generally, Langstroth type hives are used and only a few beekeepers, in the south, prefer the Dadant, bigger type.

A lot of beekeepers are making their hives at standard dimensions using Mahogany wood (Swietenia macrophylla) or Angelique wood (Guyana wood).

The average cost of production of honey is about 35 to 50 francs (US$6.00-9.00) for 1.5 kg of honey.

Of the total annual production of nearly 125,000 kg, 90% is consumed locally. Because hives are weak due to the lateness of the flowering, only one honey crop is expected in 1992.

Importation of honey has increased over these last years as follows:

1989	:	16,000 kg
1990	:	14,500 kg
1991	:	23,600 kg

This can be explained by an increase in local consumption.

Few other hive products are produced. Only two beekeepers are known to produce such things as royal jelly, hydromel and pollen. Honey sweets are only just beginning to be marketed.

Importation of royal jelly and pollen have increased during recent years.

Imported honey is commercialized only in the supermarket where it competes with local production. Local honey is sold directly to the consumer in most cases or through health shops. Imported honey comes principally from France, Florida and the Dominican Republic.

The exportation of honey is periodic and destinated to Guyana, and Europe. Some was exported to Guadeloupe after hurricane Hugo.

Given the large volume of imports, beekeepers are obliged to increase their production of honey, however, suitable land areas are being reduced due to urbanisation. Nevertheless, some necessary steps are being taken by persons interested in the preservation of the environment.

For the past five years a special effort has been made by beekeepers to inform the public of their product, using the occasion of fairs or expositions.

The visits of school students to apiaries are more and more frequent in the south, where beekeepers are working with supers of 10 frames, or in middle north, where they prefer to work with 2 or 3 supers, 18 cm high and 9 frames each.

Support from public sector institutions is very important for the development of the beekeeping industry. Principal support activities include technical instruction, subsidies and sanitary control of products. The National Forest Office is allowing the installation of beehives in new areas, like mangroves.

Martinique is involved in a national epidemiological observation system with the objective of assuring the good sanitary state of bees. Under this system an apiary specialist systematically visits the beehives, carrying out the necessary research upon the demand of beekeepers and ensuring the sanitary protection at the frontiers.

Martinique is free from different contagious bee diseases and has decided to preserve this sanitary state.

Each year, in December, beekeepers must declare to the veterinary services the number of beehives they have and their location.

Consumers in Martinique prefer a darkened and little perfumed honey, e.g. campeche, acacia, cotelette or gliricidia and avocat.

Prices for honey are about 80 to 100 francs (US$13.30 to $16.60) per litre and 54 to 68 francs (US$9.00 - $11.33) per kg; 80 francs (US$13.33) for 200 ml of hydromel and 38 francs for 220 g of pollen.

Packaging material for local honey includes bottles of 75 cl in supermarkets and glass jars of 250 ml and bottles of 1 litre for other markets. For imported honey, glass jars of 125 ml or 250 ml are the most common. For honey with royal jelly, glass jars of 125 g, including 10 g of royal jelly are used.

Local honey is commercialized under the name "thousand flowers honey"

The principal constraints faced by beekeepers in Martinique are:

- the high cost of beekeeping supplies;
- the difficulty in obtaining good quality, disease free queens;
- the presence of false Tinea (Butterfly: Galleria) in weak colonies.

Special project activities underway include:

- Training of beekeepers by specialists (particularly on tropical conditions and culture of queens.
- News bulletin (Veterinary services for beekeepers).

Everything possible must be done to preserve our bees from contagious diseases, particularly the Varroa disease which is very grave for the culture. It would be good to select a bee-free island to centre the production of high performance queens adapted to our environment.

We would like to congratulate IICA and our friends of Saint Lucia for organising this Workshop.

BEEKEEPING IN MONTSERRAT

By

Leslie and Cynthia Williams

Introduction

This presentation is made by Leslie and Cynthia Williams who are members of the Montserrat Beekeeping Association and jointly manage some 32 hives.

Montserrat has an area of 39 sq miles and a population of around 12,000 people. Agriculture is very extensive and done mainly by small land owners. The main food crops grown are carrots, corn, potatoes, string beans, cucumbers, pumpkin and pigeon peas.

Beekeeping in Montserrat

In earlier times primitive beekeeping was practiced in Montserrat. Wild hives, found between rock crevices and in tree trunks, were the targets of "honey cutters" who at certain times of the year would go and raid these hives for honey. At that time the only races of bees on the island were the German Black bee, which is very nervous and very ready to sting when disturbed, and the cassian or what the locals call "bottle-bee" which is much gentler. The environmental conditions in Montserrat are very favourable to beekeeping.

Modern beekeeping started when the Langstroth hive technique was introduced to Montserrat in 1980 by a US Peace Corps Volunteer by the name of "Hank".

The first two beekeepers established their hives by importing the modern equipment including Langstroth hive bodies, frames, foundations and a four frame extractor. In that same year, due to the aggressiveness of the German Black bee, they decided to introduce a new and better strain of bees to the island, the Italian bee.

At present there is a great interest in beekeeping on the island. Schools are beginning to participate in beekeeping as part of their curriculum and interest is growing rapidly on the island. The Agriculture Department has always been ready to assist apiculture on Montserrat in anyway they can:

(a) by allocating aid to help the beekeepers,
(b) with assistance from at least one apiculture extension officer.

A few of the main foraging plants found in Montserrat are:

Rain-fall	Mahogany	Mango
Balsam	Hogplum	Guava
White Cedar	Cashew	Avocado
Spanish Oak	Sorrel	Neim

Beekeeping as it was after Hurricane Hugo

Before Hurricane Hugo there were about 110 hives on the island, including both the German Black bees (native of Montserrat) and the Italian bees imported from North America in the early 1980's. There were 10 beekeepers in our organisation. After the ravages of Hugo, the beekeepers had lost nearly all of their hives and some beekeepers lost interest in raising bees. During those critical periods after Hugo, Leslie and Cynthia Williams withstood the test. They have been working with bees for the past nine years and supply most of the honey used in Montserrat.

Current Situation of Beekeeping in Montserrat

The beekeeping organisation has been built back up to a membership of seven beekeepers with a total of 50 Langstroth hives. We hope to develop further in the next year or two so as to meet the demand of new beekeepers.

Due to the Acarine Mite we had to discontinue ordering Italian queens from the US. Several attempts have been made to obtain bees from Hawaii but the queens all arrived dead.

The by-products of the honey, such as beeswax and pollen, need to be rendered and utilized to some useful purpose such as cosmetics, for use on furniture, candle-making or even to put back on the hive as foundation. From the beginning our wax has been wasted or goes un-utilized, so we really think we need some training in this area.

We as beekeepers would like to see a Caribbean Beekeepers unity or organisation, so that we can help to solve each others problems and at the same time not compete price-wise on the honey market with each other.

Training Needs

The beekeepers in Montserrat can manipulate their hives reasonably well, but attention must be given to more serious problems that could be encountered such as:

(a) American and European foulbrood
(b) The Varroa and Acarine mite problem

We think beekeepers in the Caribbean need to be trained to identify these problems should they arise.

APICULTURE IN NEVIS

By

Quentin Henderson, VSO
Edred Ward, MOA

Background Information on Nevis

The island of Nevis contains 36 square miles (39 sq km) and is approximately 7 miles long by 6 miles wide. Overall annual rainfall averages 46 inches.

The climate is tropical and maritime, heavily influenced by steady north-east trade winds with an average temperature of about 81 degrees Fah (27°C).

Land slopes from Nevis Peak (2,323 feet) down to sea level. Nevis is of volcanic origin and dominated by this central peak. Deep ghauts (gullies) dissect slopes below the peak, leading down to the sea. No water flows down them except during times of high rainfall. Growth cover is extensive (covering 90% of the island) but not dense. Many wetlands occur along the leeward coasts, while windward coasts are arid with low rainfall.

Total population is estimated at 9,600 of which 8% are in full-time agriculture. Most farmers are part-time farmers and this includes all the beekeepers.

There are 10 hotels on Nevis with a total of about 616 hotel rooms. There are also a variety of small self-catering establishments. The largest hotel, Four Seasons Resort, has 196 rooms. All hotels are good customers of the beekeepers. Guests buy honey as gifts and hotel kitchens use it in their cooking.

Status of Beekeeping Industry in 1992

There are presently 19 beekeepers in Nevis with a total of 90 hives of which 82 are of the Langstroth type.

There are honey flows throughout the year to a greater or lesser extent with major flows on the Leeward side of Nevis from December to March and again August to September, but flows tend to vary. On the North and South-west sides of the island the climate is drier and little honey is produced.

The principal sources of nectar, include genip, coconut, sea grape, mexican creeper, orange/citrus, mango and glyrcida.

Walter T Kelley, 3107 Elizabethan Rd., Clarkson, Kentucky 42726, USA has been the principal source of supplies and equipment.

Based on 80 beehives/20 beekeepers an estimate of the annual demand for supplies/equipment follows:

- Beehive boxes (brood boxes and supers): Estimated lifespan averages 8 years; annual replacement demand is 10 after first 3 years.

- Frames (brood and supers): Estimated lifespan averages 8 years; replacement demand is about 400 per year after 3 years.

- Foundation (brood & supers): Estimated lifespan averages 5 years; replacement demand is about 1000 sheets per year after 3 years.

- Queen Excluders: Estimated lifespan averages 5 years; replacement demand is about 10 per year after 3 years.

- Veils: Estimated lifespan is 2 years; replacement demand is about 10-20 per year.

- Smokers: Estimated lifespan is 2 years, replacement demand is about 10 per year.

- Hive-tools: Estimated lifespan is indefinite (unless lost); replacement demand is 10 per year to cover lost hive tools.

- Jars: approximately 5,000 jars/containers of various sizes per year.

Wooden ware must be well treated on the outside to prevent rot and hives set on blocks, off the ground, to get the maximum use from them. Bees will keep the inside rot free unless wax moth is allowed to start whereupon much destruction to the wood occurs.

Demands to start up new hives runs at about 20 beehives per year (estimated). This figure would be higher if potential beekeepers could be persuaded to make an investment. Many potential beekeepers on Nevis are well aware of the modest incomes the existing beekeepers are making and are reluctant to take the financial plunge.

Approximately 50-60% of Nevis beekeepers are trained in the management of moveable frame beehives. The remainder are honey cutters who occasionally go out on "High Days & Holidays" to 'cut' wild nests of bees for their honey. The wild nest is often destroyed and the bees perish, because fire is used to prevent being stung. Prior to 1987 all beekeeping was in this fashion. Estimates of wild hives of bees fall in the area of 1000.

Langstroth Beehives consisting of one or two Deep Brood boxes with 10 frames in each are the most common. Above these two or three shallow honey supers, separated from the deep brood boxes by a Queen Excluder, are used.

In the extraction of honey, the honey supers are carried to a building called "The Beehouse". Frames are decapped and honey is extracted using decapping knives, decapping tub and a Kelley 12 frame extractor.

Production cost studies have not been undertaken, however, some of t costs involved are: labour for hive maintenance, extraction and packaging at EC$7.00/hour; vehicle operation costs to carry honey to Beehouse for extraction and marketing; replacement of frames and foundations; depreciation of machinery and equipment; miscellaneous costs such as electricity for Beehouse and others.

The amount of wild honey collected is known. Annual production from the 82 Langstroth hives is estimated at 150 lbs/hive or 12,300 lbs total per year.

Beeswax candles are made from the wax cappings. This produces an estimated income of EC$2000-3000 per year for two rural women.

Market Opportunities

Four Seasons Hotel imports a large number of 1.5 oz jars of honey for its guests. These are prepared and bottled by Wilkins and Sons England. Some local shops import American honey in retail size containers.

Honey is sold to supermarkets in Charlestown, hotel shops and museums and a few of the smaller shops in rural areas. Nevis honey is exported to supermarkets in Basseterre, St Kitts and Brysons supermarket in Antigua. Additionally, honey is sold and personally exported in small amounts by friends and relatives of Nevis Beekeepers.

Consumers prefer containers that are smaller than the traditional rum bottle. They would like 12 ozs, 1 lb and 2 lbs containers. They also prefer containers that are attractively labelled and honey that is well filtered and clean. Light coloured honey is preferred, over that of dark colour. The "tropical taste" of the Nevis honey is said to be preferred to mainland USA honey.

Rum bottles with labels continue to sell well to hotels and certain local customers, in bulk quantities. There is nothing wrong with this although prices may be lower.

Most beekeepers market their own honey in containers of their choice. They are encouraged by the Nevis Beekeepers Association to sell their product in containers available from Walter Kelley i.e. 12 oz plastic bears and flat-sided 1 lb plastic jars with labels as an alternative to the rum bottle. These have proven to Nevis Beekeepers that they can sell their honey more quickly and efficiently - especially on the tourist market.

The potential on the domestic market has not been met. Some increase in demand is expected in the tourist market. Improved packaging is necessary to capture this market. Supply of the market on a regular basis will require an increase in honey production.

The penetration of the regional market will require technical assistance and advice on pricing, transport and how to deal with duties, especially in respect to final pricing to customers. Those islands not having a beekeeping industry, but plenty of tourists, e.g. St Maarten, Anguilla, are potential markets for St Kitts and Nevis.

There is great potential for marketing tropical honey in extra-regional niche markets but production capabilities must first be developed to meet regional market demands.

The following table shows the average wholesale and retail honey prices for different types of containers.

Size Container	Wholesale	Retail
12 oz Bears	EC$ 6.00	EC$6.50 - 9.00
1 lb Flatside Jar	6.50	7.50 - 8.50
Four Seasons 12 oz Jar	-	13.25
Rum Bottle	11.00 - 12.00	13.00 - 15.00

Major Problems Impacting the Honey Industry

Organisation

The Nevis Beekeepers Co-operative is relatively weak. It has neither full-time management nor profit centres. It needs to pull together more and get members to be less individualistic in their approach to beekeeping and honey marketing practices.

Honey yields on the Windward side of Nevis are low but beekeepers are disinclined to keep their bees elsewhere, where production could be better. Beekeeping is, to all Nevis beekeepers, a secondary source of income. Since income from beekeeping is low, beekeepers do not have incentives to apply the best technology.

Extraction facilities are basically good, although a lack of running water makes operations sticky, (British Aid Agencies are addressing this). Getting honey supers from beeyard to Honey Extraction centre involves use of Government vehicle and driver for 8-10 small beekeepers. This is often difficult due to poor communication.

Beekeepers are not well trained in marketing and pricing techniques.

Some beekeepers remain afraid of their bees. They are disinclined to examine their colonies for fear of being stung. The wax moth is very destructive. If bees are neglected, they become weak and Queenless by accident. The lack of a regular means of transport for the Association is a serious constraint.

Special Projects and Activities

Multi-Queen Rearing Activity is an idea in the pre-formulative stage. It has been discussed by Laurence Cutts, Chief Apiary Inspector, Florida and Quentin Henderson on Nevis, September, 1991.

Queen rearing in the USA has serious problems because of disease and adverse weather. It is known that bees on Nevis are disease free. The possibility exists that American queen rearer(s) could come to Nevis and raise queens en masse to be "Quick-packed" to USA for sale. They would use local Nevis disease free stock and raise queens anytime of the year. Local beekeepers would assist them and would supply (rent out) the beehives they would need. The skill of commercial queen rearing is highly specialised, often passed down from generation to generation of American beekeepers. It would take some years before local beekeepers could grasp the full extent of this work. What a unique export - Queen Bees!

Questions to be addressed in formulating such a project would include:

1) Cost effectiveness?

2) Suitability of Nevis bees?

3) Selling the idea to American queen rearers?

4) Selling the idea to Nevis Beekeepers and the Government for approval?

5) Safe transport of queens from Nevis to USA?

6) Obtaining authorization from the USDA?

BEEKEEPING IN PUERTO RICO

by

Daniel G Pesante

Background Information

Puerto Rico has a territorial extension of 63 km by 22 km or 1,386 square kilometers. It exhibits seven distinct types of ecological environments ranging from xerophitic in the south south-west to the dwarf tropical rain forest in the north-east. Most of the island's surface is dominated by low mountain ranges that run centrally from the east to the west. The highest peak has an altitude of 1,400 meters. Over 75% of the island is dominated by mountainous structures, the remainder are coastal plains. The northern part of the island receives higher rainfall activity with a mean of 1,500 mm (60") while the south receives a mean of 1,000 mm (40") a year. Population is estimated at 3.3 million with a GNP per capita of $6,174 and a percent GNP for agriculture of 2%.

Present status of beekeeping industry

Puerto Rico averages two harvests of honey a year, the first takes place during May or June. Bees start to amass nectar by the second week of February on through April - May. During this nectar flow an awesome number and type of plants contribute to the honey harvest. Among them you will find herbs, vines, shrubs and small trees. Honey from this harvest has a mild but exquisite "wild flower" flavor, it is also darker (amber) and denser (17.5-18% water) than honey from the second harvest (light amber, 17.5-18.5% water). This first harvest usually takes place during the dry season.

Only three or four species of large trees contribute to the second nectar flow. Among these are Inga vera (Guaba), Inga laurina (Guama), Andira inermis (Moca), and Eugenia jambos (Pomarosa). The first two species are common in abandoned coffee plantations, where they are planted to provide shade to the coffee bean bush. This second bloom is onset by a period of from one to two weeks of no rain during the rainy season. This makes this nectar flow highly unpredictable, taking place any time from July to December. This summer-fall honey is always lighter in color, a beautiful light gold, and more delicate in flavor than the spring harvest. Sometimes we get a third nectar flow in November-December and on rare occasions even a fourth nectar flow.

Apiculture Equipment

The State Department of Agriculture has 31 stores that sell agriculture related supplies, 7 of them handle apiculture equipment at reasonable prices (bottom board, one brood chamber with 10 frames with wired foundation, one queen excluder, two 6-5/8 shallow supers with frames and wired foundation, a plastic telescoping cover for $55). However, most of the stores lack a complete inventory of the necessary materials. As a result many beekeepers purchase their

materials in the mainland US incurring very high shipping costs of from a third to half of the value of the purchased goods. Same list of materials as above may cost $100. Other beekeepers build their own beehive materials, where lack of uniformity results in further management problems. We have about 250 beekeepers managing a total of 6,000 beehives, for a mean number of 24 colonies per beekeeper. Most beekeepers have only one beeyard or apiary.

The bulk of the honey is extracted using hand cranked four frame tangential extractors, a small number of beekeepers have large capacity radial extractors. Usual mode of uncapping is with a large heated uncapping knife, very few uncapping machines (2-3) are in use. Cappings are dropped on to a screened platform where the honey collects in the bottom compartment. The honey is not heated or filtered. The harvest is usually placed in 55 gal drums (330 kg) and left to clarify for two to three weeks after which the honey is bottled by means of a gate located in the lower part of the storage tank. Excellent quality honey is packed this way. Even though granulation problems may arise our consumers prefer this honey.

Annual honey production is estimated at 216,000 lb (98, 181 kg) for a mean production per colony per year of only 3 gallons (35.25 lb). Beeswax sells wholesale for $0.90 to $1.00 per lb and is used in the manufacture of batik, candle making, wood and floor polishes, waterproofing canvases and strings, soap making and others. Some royal jelly is sold at anywhere from $1.00 to $5.00 per gram. Queens are sold from $7.00 to $9.00 and three frame nuclei sell for $35.00 to $40.00.

Present Markets for Hive Products

Three quarters of the honey consumed in the island is imported from the Dominican Republic (90%), the United States of America, Mexico and China share most of the remaining 10 percent. Honey sells for approximately $2.00 to $2.50 per pound at the supermarket, which is mostly imported honey. Local honey sells for a wide range of prices, a gallon (11.75 lb) may sell from $8.00 to $20.00 with an average price of $10.00. A drum of honey (55 gal - 330 kg) sells for $350.00 - $400.00. These high prices per drum are the result of only one or two drums being purchased at a time to be bottled in 200 ml and 750 ml re-used rum bottles.

Major Problems

Of main concern is the lack of organization and direction among the beekeepers even within the Asociacion de Apicultores de Puerto Rico. There is great resistance to the incorporation of modern beekeeping techniques. As a result, there is only one serious beekeeping operation in the island with approximately 400 colonies. It is not owned by a local.

The best beekeeping areas, the drier parts of the island, are under-utilized. Poor colony management results in lower quantities and qualities of honey. Beekeepers tend to use dark combs for honey production and there is little or no management of the brood chamber. Yields of 10 to 12 gallons per colony per year are not uncommon in the well managed colonies in the drier

coastal environments, as opposed to 2 to 3 gallons per poorly managed colony per year in the mountains, and 5 to 6 gallons per well managed colony per year in the same humid mountainous environment. Marketing honey in proper containers and with attractive labels makes it easier, as opposed to bottling honey in re-used rum bottles.

Project Activity

Present projects include the diffusion of technical information on colony management for honey production and pollination by making farm visits to the beekeepers and providing them with theoretical and practical experience. Other areas of interest covered in these educational programs are, honey extraction and handling in tropical environments, and queen rearing. Another area covered is disease detection and control which is conducted in conjunction with the State Department of Agriculture.

As of now, we only have one person with expertise in apiculture. However, this is the beginning of a new era in beekeeping for Puerto Rico and as with any newly adopted educational program, it takes considerable effort and above all, time to see the desired results. We are very positive that new beekeepers will join the beekeeping community with the hope that they will adopt modern beekeeping practices from the beginning.

MAJOR CROPS HARVESTED IN PUERTO RICO DURING 1988-89

CROP	QUANTITY	PRICE	TOTAL VALUE (millions)
Sugar	91,249 tons	$382.65	$22,172
Coffee	320,000 (100 lbs)	$182.98	$58,544
Bananas	571,000 (1000 units)	$ 15.83	$ 9,039
Plantains	318,600 (1000 units)	$127.60	$40,654
Pineapples	54,037 tons	$257.98	$13,941
Mangoes	54,037 (1000 units)	$304.96	$ 7,497
Tomatoes	37,800 (100 lbs)	$ 29.12	$11,007
Peppers	93,000 (100 lbs)	$ 30.46	$ 2,827
Squash	485,000 (1000 units)	$ 17.29	$ 8,386
Oranges	153,400 (1000 units)	$ 32.00	$ 4,909
Avocadoes	18,800 (1000 units)	$201.82	$ 3,794

BEEKEEPING IN SAINT LUCIA

Hugh Sauer

Background Information on Saint Lucia

The island of Saint Lucia, with a population of 140,000, is one of the Windward Islands of the Caribbean, situated some 1500 miles South and a bit East of Miami, Florida. Martinique lies 21 miles to the north and St Vincent is 26 miles South of Saint Lucia. It is 27 miles long and 14 miles wide, with a total of 238 square miles in area. Being volcanic in origin it is rather mountainous, with Mount Gimie having the highest elevation of 3,117 feet. The souther part of the island is flatter and consequently more arid.

On February 22, 1979, Saint Lucia became an Independent State within the British Commonwealth.

The temperature ranges between 70°F to 80°F during the Winter months, from November to February. During the Summer months, from April to October the temperature will rise to 90°F. The islanders are always grateful for the North East Trade Winds, that moderate the Summer heat.

Bananas are not native to Saint Lucia but are responsible for about 70% of the island's economy. The latest annual statistics (1991) show EC$176 million worth of bananas were exported, mainly to the UK. Many non-traditional crops are exported as well, like mangoes, breadfruit, yams and citrus fruits. Coconut oil is processed on the island at Soufriere.

Tourism is the next greatest source of income for the island. There are 24 hotels of 10 rooms or more, making some 3,000 rooms available to the trade.

Present Status of Beekeeping Industry

In March of 1986 the Mille Fleurs Honey Producers Cooperative (Mille Fleurs) was registered. It was originally formed to export honey in volume, but due to lack of organisation this never came to pass. The Co-op holds monthly meetings and sells bee supplies to their members, at a discount. They also sell to non-members, at their location in Thomazo. The Agriculture Association in Castries, also sells bee supplies and equipment to its members.

The Mille Fleurs Co-op requested a beekeeper from the US Peace Corps to enumerate the hives on the island and determine the amount of honey being produced. A three page questionnaire was executed to generate baseline information on beekeepers in the country. The interviewing and canvassing of the island for hives is nearly complete and over 800 hives have been located. The remaining southern part of the island is expected to have fewer hives as it is more arid and less populated. The average number of hives per beekeeper is about 20. Their average annual production of honey is about 55 pounds per hive.

Only the logwood in February and the mangoes in May are left in sufficient quantity to generate large honey flows and they are fast falling to the cutlass for charcoal. However there are some citrus fruits, ti-bonne, blanc, glory cedar, la taine, mohoe nair and bay leaf that produce some nectar throughout the year that helps to sustain honey bee.

There is no honey bottling equipment on the island. A calabash gourd is usually used for a dipper to fill recycled containers with strained honey. The only hive product other than honey used on the island is beeswax. Some wax is used in candle making, in milling foundations and in the batik industry.

There are some hand operated wax foundation mills in use on the island today. The owner of the mill usually charges EC$1 a pound to work the wax supplied by the interested party. These mills can make 7 to 8 sheets of foundation per pound of wax as compared to EC$2.25 a sheet, for store bought foundations.

Many of the hive boxes and frames on the island are hand made using the Langstroth design. One bee farmer uses poured concrete hive boxes and covers. A complete, painted, wooden, hive box with frames and wired foundation will retail for about EC$250 here on the island. A three pound to five pound colony of bees, with a fertile queen brood box and super, will sell for EC$450.

Market and Marketing

Most of the honey produced on the island today is extracted with either a 2,3, or 4 frame hand driven extractor. Some of this honey is then strained and bottled in recycled quarts and fifths. The bee farmer receives EC$16 or $17 per bottle which then retails for about EC$20. Perhaps half the national production of honey is sold on the island of Martinique. Vendors carry the honey there in bulk containers and retail it for almost twice the Saint Lucian price. When a bee farmer supplies a local hotel with honey, it is usually by verbal contract and the honey is delivered in recycled gallon containers. The bee farmer can take advantage of the tourist trade for an added source of revenue. Honey attractively packaged in novelty sizes, makes great gifts to take or send home. Disposing of the honey produced on the island is more of a transportation problem than one of finding a market for it.

Problems and Constraints to Beekeeping in Saint Lucia

Saint Lucia is very fortunate to have so many factors favourable to a successful beekeeping programme already established. There is of course the occasional hurricane, the wax moth and limited bee pasture, which only makes beekeeping a more interesting challenge.

Measures can be taken to minimize the effects of a hurricane on a bee yard and with proper hive management the wax moth can be kept under control. Many beekeepers do not manage their brood chambers properly and queens are allowed to grow old and unproductive. Many very successful beekeepers in the USA requeen annually to insure maximum egg and honey production. A good supply of quality queens is essential for maximum production from an apiary.

It is possible to import queen bees into the island of Saint Lucia when they are accompanied by an official government health certificate stating they are free of diseases. The queen must be shipped in a special container that has had no previous contact with other bees or bee equipment. She must also be certified to be African Killer Bee free and to come directly to Saint Lucia from the point of origin. Upon arriving the queens are to be inspected by the Quarantine Officer.

Some beekeepers have experienced problems when trying to import queen bees. When requesting a permit from the Ministry, to import the queens, the beekeeper is given a time slot during which time the queens must arrive on the island. If any of the many variables involved in ordering queens is interfered with and the queens arrive late, a new time must be arranged to bring in the queens. It's this time delay that causes so many queens to arrive dead, as their shipping life is short. Unfortunately, bees are classed as animals and carriers that can expedite delivery are not permitted to carry animals.

Saint Lucia is presently free of all diseases and parasites that plague other beekeepers in most areas of the bee world today. This is a very desirable condition and one we hope to maintain because of our intent to raise and export queens. When I see off-island honey on the grocer's shelves, as a result of an inconsistent supply of local honey, I become very apprehensive. Foul Brood spores are prevalent throughout most of the bee world today and they can be transmitted in honey. Perhaps legislation could be enacted to get the time slot for importing queen bees extended or eliminated and restrict the imports of queens and honey from areas that are known to be infested with Foul Brood.

Probably the greatest constraint to beekeeping in Saint Lucia is the limited and declining amount of bee pasture.

Special Projects and Activities

Our lack of bee pasture has been recognised and the Forestry Department is making an effort to have nectar producing nursery stock available for the bee farmer to plant his hillsides. The distribution of these plants will be carried out by the Department of Agriculture.

Several new species of nectar producing plant seeds have been introduced onto the island. These plants produce nectar at different times of the year and some produce through-out the summer months. Where Colliandra calothyrsus is planted in plantations in South America a ton of honey per hectare has been harvested by the bees annually, producing a retial value of about $13,000.

Roots Farm is expanding their beekeeping programme from 50 hives to 100 hives. They are mostly raising their own queens and dividing. Their 20' x 16" block honey house is presently being finished and it will house their recently acquired 12 frame, radial, electric powered extractor. The honey house will also be used to bottle honey and to store their empty containers and equipment. They use a lot of 8 ounce honey bear containers to sell their honey. With their own attractive labels attached the honey bears have a lot of sales appeal.

Beekeeping has advanced considerably since Dr Langstroth first discovered the significance of the bee space and made possible the first practical removable frames from a hive box that still bears his name. It is not unusual in the USA to average 100 pounds of honey per hive, in 6 months, between frost dates. This entails proper hive management and sufficient bee pasture. Except for insufficient bee pasture and low honey production, Saint Lucia is similar in every way, pertaining to beekeeping, as the island of Hawaii where they produce 150 pounds of honey annually, per hive. Our goal is to equal that average when our bee programme is fully implemented.

The potential for a successful beekeeping programme here on Saint Lucia is tremendous and hopefully it will be realised in the near future. When sufficient bee pasture is established and the beekeeper becomes aware of modern beekeeping methods and techniques acquires adequate training in this technology, the beekeeping programme will be assured of success. As farmers learn how lucrative a hive of bees can be, their numbers will increase rapidly. Saint Lucia will someday be known as an exporter of hive products, instead of an importer. Our efforts here today are going to go a long way towards the achievement of that goal.

STATUS OF BEEKEEPING IN ST. VINCENT AND THE GRENADINES

by

Lennox James

Background Information

The surface area of St. Vincent and the Grenadines (SVG) is 388 Km^2. The island of SVG is divided into two main ecological zones: the Northern, which is mainly high rainfall and surrounds La Soufriere volcano, and the Southern, characterized by low rainfall.

The island contains a central mountain range with a number of valleys running from the center to the coast.

The Grenadines, small and near sea level, are semi-arid. They produce relatively small amounts of bee pasture.

The population of St. Vincent and the Grenadines is approximately 110,000 persons. Some 34% are involved in agriculture.

The major agricultural crops grown in St. Vincent and the Grenadines are:

- Root Crops: sweet potatoes, yams, dasheen and tannias;
- Vegetables: tomatoes, cabbage and lettuce;
- Legumes: pigeon peas;
- Tree Crops: mangoes, avocadoes, golden apple, spices and citrus;
- Bananas and plantains

The principal export crop is bananas.

The hotel industry plays a very important role in the economy of the country. There are 47 hotels with a total of 1059 rooms. Most of the hotels are located in the Grenadines.

Present Status of Beekeeping

Beekeeping in St. Vincent and the Grenadines has been at the hobby/small business level for generations. There has never been an Association or Society of Beekeepers. Presently, there are some seventeen active beekeepers, including two on Bequia in the Grenadines. The total number of colonies is estimated at 214, an average of 13 per Keeper. Both deep and shallow supers are used.

Most equipment is purchased abroad from the USA, Canada or the United Kingdom through individual efforts and shipped to St. Vincent and the Grenadines (duty free). Boxes are also made locally by the students at Liberty Lodge Reform School in Kingstown. Current prices of items purchased at Liberty Lodge are

EC$114.00 for the Brood Chamber, EC$60.00 for the Low Profile "Super"and EC$80.00 for the High Profile "Super". Two critical components that are unavailable at Liberty Lodge are excluders and wax foundation. Both must be purchased from an outside source.

The annual demand for beekeeping equipment is estimated as follows:

- boxes: 75
- frames: 750
- foundations: 800 sheets
- hoods: 20
- smokers: 20
- hive tools: 20
- jars: determined
- there is need for extractors

There is one main honey flow per year during the months of December - January. During this period nectar and pollen are collected from the following trees: mangoes, citrus, avocadoes, golden apple, ackee, java plum, damsel, angeline, tamarind, green heart and gliricidia.

During the rest of the year, some nectar and pollen are obtained from trees such as cabbage palm and royal palm.

Trees which blossom perennially include: cabbage palm trees, royal palm trees, cluster palm trees, cannon ball trees, living stone trees, coconut, mango, plumrose, hog plum, dunts plum, angeline, gliricidia sepium and carambola.

Honey is extracted mainly by draining. There are only two manual and one electrical extractors known in St. Vincent and the Grenadines.

The cost of production is estimated to be about EC$329 per colony for the first year. That includes: top and bottom, two brood boxes, queen excluder, super, foundations and queen (replacement cost). During the second and following years maintenance costs are approximately EC$120.00 per colony.

Beekeeping in St. Vincent and the Grenadines is in a developing stage. Most of the keepers are very new to the culture. No records are kept on honey production, but total production is estimated to be in the range of 10 - 12,000 lbs annually.

The production of honey is approximately:

- 45 lbs per colony with shallow super per year
- 90 lbs per colony with deep super per year

Honey is the only bee product produced.

Markets for Honey

Approximately 2,500 lbs of honey is imported into the country each year under various trademarks including: Hyde Park, Sue Bee Clove Honey, Orange Blossom, Joe's Honey, Florida Tropical Wild Honey and Giant Food Honey, all from the United States. The value of the imported honey is estimated at EC$20,000.00

Local honey is sold on the domestic market. Local consumers prefer honey packaged in one pound plastic jars. Local producers sell their honey directly to supermarkets and shops. In the case of the smallest producers their honey is retailed directly to consumers. A substantial part of the local market is already satisfied by the local honey.

Problems Related to the Honey Industry

Honey production is carried out on an individual farmer basis. There is no beekeepers organisation. This is felt to be a constraint to improving production and productivity.

The main production problems are:

- presence of the wax moth;
- lack of beekeeping technology available to beekeepers, and
- high cost and unavailability of tools and equipment.

There is a general lack of experience in modern beekeeping practices. There are no major marketing problems.

Projects in the Pipeline

The Ministry of Agriculture, Industry and Labour has budgeted EC$10,000 towards Beekeeping Research/Training in 1992. These funds along with the personal interest in the Ministry of Agriculture (five of the eighteen beekeepers are employees of the Ministry of Agriculture) will generate greater interest in Beekeeping and the possible forming of a loose-knit association in the near future.

The Ministry would like to increase the number of apiaries by fifteen by the end of 1992.

APICULTURE IN TRINIDAD AND TOBAGO

By

MOHAMED K.I. HALLIM

This paper gives some background information on Trinidad and Tobago, the present status of the beekeeping industry, the markets and marketing systems for hive products, the major problems and constraints which impact on the honey industry and the existing projects and activities that are in place for the development of apiculture in this twin island country.

Background Information on Trinidad and Tobago

Trinidad and Tobago are two islands 34 km apart and comprising of 5128 square kilometers (1980 sq miles or 512,000 ha) in all. Trinidad is the most southern of the Windward Islands and is 15 km north-east of Venezuela.

Three chains of mountains run east-west across the north, central and south of Trinidad with the Northern Range rising to 940 m, the Central Range to 305m and the Southern Range to 152m. The rest of the island is flat and undulating terrain. Tobago with a size of 116 sq miles has a hilly main ridge that is an extension of the Northern Range in Trinidad. About 40% of Trinidad and Tobago is still under rain-forest vegetation especially in the highlands. However, there is an increasing amount of hectarage under teak and pine plantation.

The annual rainfall is 1800 mm with 90% falling in the wet season from June to December. The average high and low temperatures are 31° and 21°C respectively.

About 33% of the land area is arable with the major agricultural crops grown being sugarcane, coconuts, citrus, cocoa, coffee, tobacco, bananas, rice and corn. The major crops exported are sugarcane, cocoa, coffee, fruits and vegetables.

The population is approximately 1.3 million with approximately 40% employed, out of which 10% are engaged in agriculture. Beekeeping employs about 1% of those employed in agriculture.

Tourism is a very important and growing industry especially in Tobago, the resort island. There are over 90 approved hotels, guest houses and bed and breakfast accommodations.

Status of the Beekeeping Industry in 1992

There are presently 430 beekeepers in Trinidad managing 4,640 colonies of Africanized honeybees (Apis mellifera scutellata) while in Tobago there are 35 beekeepers managing 600 colonies of European bees (Apis mellifera). In all therefore, there are 465 beekeepers managing 5,240 colonies of honeybees. The average number of honeybee colonies managed per beekeeper is approximately eleven (11). In addition there are about 47 colonies of stingless bees (Meliponia trinitatis and Melipona favosa) being managed for honey production by an equal number of beekeepers.

The average reported honey yield per colony in Trinidad in 1991 was 18 litres per annum (52 lbs or 23.6kg) while in Tobago it was 22.5 litres per annum (65 lbs or 29.5 kg). Total production for Trinidad and Tobago in 1991 was estimated at 97,020 litres (21,560 galls. or 280,280 lbs or 127,140 kg).

Honey production is derived from one major honey flow from January to mid-June which is the dry season in Trinidad and Tobago. There is a minor flow during September to October in the "Petite Careme" (a short dry spell of about three weeks in the wet season) but few beekeepers extract any honey at this time.

The major types of vegetation from which nectar and pollen are collected are forest and fruit trees, weeds, shrubs and mangrove plants. Common forest tree species include yellow poui, cypre, white fiddlewood, angelin, campeche, log wood, immortelle, rubber, black mangrove, mahogany, cajuca, crappo, foforite and saman tree. Fruit tree species include coconut, citrus, coffee, avocado, cashew, guava, mango, hog-plum, chennet, pomerac and passion fruit. Common bee weeds and shrubs include corallita, railway-daisy, Christmas bush, ground mint, kudzu, watergrass, ti-marie, whitehead broom and jiggerbush.

The major suppliers of all beekeeping equipment and supplies, except bee boxes, are from the United States and Canada. Most of the bee boxes are made locally and there has also developed a cadre of local artisans over the last few years who are making bee frames, bee suits, bee veils and some wax foundation sheets. Several models of honey extractors have also been manufactured locally by CARIRI.

It is difficult to properly estimate the annual demand for beekeeping equipment because of inadequate record keeping, poor data collection and because several beekeepers make their own wooden hive boxes. Also the replacement of wooden hive parts varies throughout the country depending upon the degree of destruction caused by termites and wax moth larvae. Bearing this in mind, I estimate the annual demand to be around 1000 top and inner covers, supers, brood boxes and bottom boards, 15000 brood frames, 7000 super frames, 5000 lbs wax foundation sheets, 500 bee veils, 300 bee suits, 300 leather gloves, 100 bee helmets, 150 hive tools, 300 smokers, 20 extractors, 200 queen excluders, 1000 feeders and a small quantity of honey jars. The bulk of the honey is packaged in used 750 ml glass rum bottles.

The main type of super used is the shallow super. Few beekeepers use deep supers which are very heavy when full with honey. Extraction is done by

centrifugal extractors of various types and sizes - radial, tangental and from 2 - 24 frames capacity.

Apiculture in Trinidad and Tobago is carried out with the recommended modern practices. Langstroth hives are used with all the necessary beekeeping equipment and supplies. However, beekeeping can be considered as small scale and large sophisticated honey processing equipment is not used.

Special practices have been developed for the management of Africanized bees in Trinidad and beekeepers are generally following the recommended guidelines. In Tobago while beekeepers are managing European honeybees, new apiaries are being established in accordance with the guidelines in place for Africanized honeybees.

The art of queen rearing, artificial feeding, colony division etc. is well known to most beekeepers. The Ministry of Agriculture, Land and Marine Resources has for years now been involved in the teaching of apiculture to existing and potential beekeepers. The collection, drying and storage of pollen and the saving and processing of crude beeswax are two areas of apicultural development now being encouraged. There is a growing demand for pollen in health shops and the batik industry is purchasing all the crude beeswax available. Beekeepers also sell starter colonies (3 and 5 frames) and some improved honeybee queens.

The major pest continues to be the Greater Wax Moth (Galleria mellonella) even with Africanized honeybees. The bee house (Braula coeca) and ants (Camponotus abdominalis and Eciton burchelli are occasional pests. Recently (February 1992) two hives in Cedros, South Trinidad, were found to be severely damaged with the Phorid fly larvae (Phoridae).

There are none of the major diseases of honeybees in Trinidad and Tobago. However in 1988 a virus disease called Sacbrood was imported with European bees reported to be coming from Canada but later found to have originated in New Zealand. Several hives were burnt in several apiaries in 1989 but today the disease continues to be insignificantly present in one apiary.

The absence of major diseases is attributed to the very strict regulations in force with respect to the prohibition of honey and used beekeeping equipment and other restrictions on the importation of other bee products and honeybee queens.

Markets for Hive Products

All honey produced in Trinidad and Tobago is easily and completely sold on the local market. Retail prices range from $25 - $35 TT per 750 ml bottle or $150 - $210 TT per gallon ($35.05 US - $49.07 US per gallon or $2.70 - $3.77 US per lb). It is estimated that only 15% of the demand for honey is satisfied. Honey is prohibited from being imported as a bee disease prevention measure.

There is a complete range of honey colours from light to dark and people have different preferences. The important point is that all honey produced is

sold. Consumers prefer the 750 ml glass bottles to the smaller jars (1 lb or 330 mls etc).

Pollen and royal jelly are not permitted to enter into the country by the Inspector of Apiaries. However, a small quantity do get into the country and are sold at health shops and drug stores. The regulations on these products are vague and they need to be modified and enforced.

Honey is sold directly to consumers, from beekeepers' homes, and through supermarkets and small groceries. There are a few middlemen who buy in bulk and do their own bottling, labelling and selling. When necessary beekeepers also buy from each other. From the information available, I would say that there is a great potential for expanding sales on the domestic, regional and extra-regional market. Of course, the world market prices of honey are less than the local prices so that profits will have to be made on bulk sales. England has showed a great interest in purchasing honey from Trinidad and Tobago especially since 1988 when this country began winning prizes in the National Honey Show Competition which is held annually in London, England.

Major Problems and Constraints

In Trinidad, the major problem and constraint is the defensive nature of Africanized honeybees. Severe disruption of the industry occurred after their introduction in 1979, resulting in many apiaries being closed down or destroyed. Also serious public safety problems occurred from incidents involving wild unmanaged colonies of Africanized honeybees. Many people and animals were stung resulting in several fatalities. Apiary sites to develop beekeeping or relocate defensive apiaries have become very scarce and this has become a major obstacle to the expansion of apiculture in Trinidad.

In Tobago, the major constraint is the prohibition placed on the importation of honeybee colonies and queens from Trinidad in order to reduce the possibility of importing Africanized honeybees. Also Government apiaries in Tobago are only producing a few queens and starter colonies and this is a restriction on the development of the industry. There is also a scarcity of technical expertise in apiculture in Tobago which has to be addressed. Apart from this there are no other major problems except the regular problems all farmers face - inadequate credit and access roads and an increase in praedial larceny.

Special Projects and Activities

a) Training Courses in Apiculture

The Ministry of Agriculture, Land and Marine Resources continues to hold regular one week beekeeping training courses and one day seminars in specialized areas for both existing and potential beekeepers. Areas covered include the management of Africanized honeybees, queen rearing, nuclei production and pest

and disease diagnosis. In 1991, eighty-eight people received training for one week in apiculture on Government apiaries and stations.

b) Queen Rearing and Starter Colony Production

In Trinidad, and to a lesser extent in Tobago, the Government apiaries have a program to produce improved honeybee queens and nuclei for sale to existing and prospective bee-keepers. Virgin European queens (from Hawaii) are free mated with African drones in Trinidad and beekeepers are encouraged to requeen captured colonies, swarms of Africanized honeybee and very defensive managed colonies, with them. Not enough queens are ever produced and the extension program is now aimed at encouraging the beekeepers to rear their own improved honeybee queens and starter colonies.

c) Beekeepers Organizations

There has been in existance for decades now the Trinidad and Tobago Beekeepers Association. This is an active association promoting the development of apiculture in Trinidad and Tobago.

Recently a new organization has been formed in the eastern counties. It is called the Association of Professional Apiculturists and one of its main objectives is to bulk purchase beekeeping equipment and supplies for its members.

SECTION 3

TECHNICAL PAPERS

AFRICANIZED BEES IN TRINIDAD AND TOBAGO

By

M.K.I. Hallim

The African honeybee, Apis mellifera scutellata, from South Africa and Tanzania was introduced into Brazil in 1956 for experimental cross breeding with the European honey bees there (the progeny of these crosses are called Africanized honeybees). From Brazil they established themselves in every country in South and Central America (except Chile), in Trinidad and recently (1990) in Texas, USA. They are not identified to date in any of the islands that are members of the Organisation of the Eastern Caribbean States.

This paper is based on my experience with Africanized honeybees in Trinidad. Note that even though there was some evidence that a very few colonies of bees had become Africanized in 1988 in Tobago, the honeybees in that island are today considered to be of the European race.

1. THE EFFECTS OF AFRICANIZATION

(a) Decline in the Number of Managed Colonies

Africanized honeybees (from now onwards written as AHB) have been continuously migrating from Venezuela, South America into Trinidad since 1979. Note that the shortest distance that AHB would have flown over the Caribbean Sea from Venezuela (where they were first identified in 1979) to Trinidad is 15 km.

Records indicate that in 1978 there was an estimated 407 practicing beekeepers in Trinidad managing an estimated 7,060 colonies of European honeybees (German, Italian, Carniolan, Caucasian and their crosses). Tobago had 12 beekeepers managing 150 colonies. Recently (1992) it was estimated that there are 430 practicing beekeepers in Trinidad managing 4,640 colonies of AHB, while in Tobago 35 practicing beekeepers manage 600 colonies of European honeybees (EHB).

In other words, approximately thirteen (13) years after the initial arrival of AHB into Trinidad, while the number of beekeepers in Trinidad have increased by 23 i.e. by 6%, the number of colonies of honeybees managed have declined by 2,420 or 34%. The colonies managed had all become Africanized either by direct colonization of EHB with AHB swarms or by their European queens being superseded and replaced with first generation AHB queens (virgin EHB queens mated in the wild with African drones) or after swarming of EHB colonies, the remaining part of the colony became headed by first generation AHB queens.

(b) Increase in Honey Yield in Trinidad

However, a very important statistic is that honey production in Trinidad in 1978 with EHB was estimated at 85,144 litres, while with AHB in 1991 it was estimated at 83,520 litres, a decline of merely 1,624 litres or approximately 2%. In other words, although there was a 34% decrease in the number of colonies managed from 1978 to 1991, there was only a subsequent decrease of 2% in honey production. From another viewpoint, the average honey yield with EHB in 1978 was estimated at 12.06 litres per colony in Trinidad while in 1991 with AHB it was 18 litres per colony. AHB, therefore at an average, produced about 50% more honey per colony in 1991 than EHB produced in 1978 in Trinidad. It is to be noted that this yield was produced in the presence of at least 3,016 feral colonies of Africanized honeybees (See later).

It must also be mentioned that the average yield per colony with EHB in Tobago has generally been much higher than in Trinidad. In 1991 honey yield was averaged at 22.5 litres per colony per annum in Tobago. This may be so because of the apparently greater amount of bee forage per hectare in Tobago than in Trinidad and the fact that EHB in Tobago do not have to compete with thousands of wild colonies of AHB as do their Trinidad counterparts. Also it is much more difficult to manage AHB than EHB.

However, it must be pointed out that the few European queens that were imported into Trinidad in the last five years hardly ever resulted in colonies that produced excess honey for extraction. In fact the population of the EHB colonies quickly became very depleted because they were out-competed for bee forage by AHB.

(c) Increase in Bee Stinging Incidents

There were few public safety problems with honeybees before the arrival of AHB in 1979. As far as I am aware there were only two reported human deaths due to bee stings during the period 1903-1978 and very few animals had been killed by bees. Also few swarms were ever reported to the Ministry of Agriculture.

However, with the arrival of AHB in 1979, bee stinging incidents and reports of bee swarms have significantly increased. During the period 1979-1991 (twelve years) over 26,000 swarms and established feral colonies of AHB were removed (destroyed or collected) by the Ministry of Agriculture and beekeepers throughout Trinidad. On many occasions these feral colonies were responsible for serious bee stinging incidents prior to their removal. Over 5,000 persons have so far been stung and of these, 10 persons have definitely died from bee stings. Many others were in critical condition in hospital before recovery. Also, over 760 animals died including poultry, dogs, monkeys, goats, cows and donkeys.

(d) Increase in Nuisance Apiaries and Subsequent Results

Throughout the period apiaries became Africanized as described above and they became more and more a nuisance to neighbours, especially those apiaries that were kept in the beekeepers' backyards. Neighbours constantly complained to the Ministry of Agriculture about minor bee stinging incidents, harassment by bees and other forms of bee nuisances.

This coupled with the lack of adequate knowledge and skills by beekeepers in the handling of AHB in the early years (1979-1984), led to the closure or sale of abandonment of more than half of the estimated 407 beekeepers who were practicing in 1978 with EHB.

A few beekeepers were able to be relocated but they generally relocated with fewer colonies than before.

Bee nuisance problems continue to exist in several areas of Trinidad today. Often the "nuisance" beekeepers have not found any alternative sites to relocate and it maybe only a matter of time before they too give up their beekeeping businesses.

2. ACTION TAKEN RE: AFRICANIZATION OF APIARIES

(a) The 1979-1983 Period

In the early years (1979-1983) when the number of swarms or feral colonies of AHB sighted were low in numbers (See Table 1) the policy of the Ministry of Agriculture was to destroy all swarms and feral colonies reported. Even some beekeepers' colonies what were identified as Africanized or too defensive to handle were destroyed by the beekeepers themselves. However, the Ministry's advice had always been to replace the queens of very defensive colonies with imported European queens or their daughters. In that period it was the belief that were still a lot of European drones around to mate with virgin European queens. Beekeepers were not officially encouraged to collect AHB swarms and feral colonies for management in their own apiaries.

(b) The 1984-1992 Period

However by 1984 (5 years later) it was apparent to most that all beekeepers apiaries had become fully Africanized, even though some beekeepers continued to deny this. Reports of AHB swarms and feral colonies in 1984 had increased five fold over 1983 reports. From then until today, the number of swarms and feral colonies removed by the Ministry and beekeepers were approximately 3000 per annum (See Table 1).

TABLE 1

AHB Swarms and Feral Colonies Removed During the Period 1979-1991

1979 - 12	1984 - 3773	1989 - 3010
1980 - 50	1985 - 2993	1990 - 3255
1981 - 133	1986 - 2705	1991 - 3016
1982 - 613	1987 - 3027	1992
1983 - 737	1988 - 2763	

By September 1984 the Ministry's policy with respect to the collection and management of feral colonies and swarms of AHB changed with the return of the Inspector of Apiaries from Canada after completion of his MSc programme in Extension Education and Apiculture. Beekeepers and Government bee personnel were encouraged to ensure that all captured swarms and feral colonies were requeened with first generation Africanized queens produced on Government apiaries and sold at subsidized prices (in 1992 - $10 TT for a mated queen and $5 TT for a virgin queen).

Extension programmes based on the management of AHB as opposed to the management of EHB were intensified. Through one week practical skills courses and one day seminars, beekeepers and prospective beekeepers were taught the management practices for handling AHB, queen rearing, pest and disease diagnosis and the manufacture of simple beekeeping equipment. Management practices taught, included: the locating of apiaries 200 metres from the nearest house or place where people congregate 100 m from the nearest road, the provision of shade, the use of individual hive stands alone, the spreading apart of hives by three metres, the feeding of bees in the wet season, when necessary, to reduce absconding, measures to reduce swarming and absconding, regular requeening, proper smoking of colonies and the use of full protective bee clothing.

During the period 1984 to the present over 700 beekeepers and prospective beekeepers were trained in beekeeping as described above. Most of the new beekeepers who started apiculture during this period, carried out most of the practices in the recommended manner. It is only the older beekeepers who are slow in changing, some of them still keep their hives on long continuous stands. All have learnt, however, that Africanized honeybees can be very defensive if not handled properly and all have learnt that these same bees, if managed according to guidelines given by the Ministry of Agriculture, can produce higher honey yields than the previously managed European honeybees.

Finally, it is also now apparent that the Ministry cannot produce adequate numbers of first generation Africanized honey bee queens due to many difficulties including the inadequate importation of European honeybee queens. As a result, beekeepers are being encouraged to select the least defensive and most productive Africanized colonies and to rear queens form them to requeen colonies that become very defensive or unproductive.

The possibility that Africanized bees can be transported to other islands in the Caribbean and subsequently established is real. Measures must be taken by the Governments of these islands to prevent entry and if these measures fail, then to deal with the problems that these Africanized bees will subsequently cause. The experience we have with Africanized honeybees in Trinidad could be useful in this event.

POSSIBLE IMPACT OF THE AFRICANIZED HONEYBEE ON THE APICULTURE OF THE CARIBBEAN

By

Daniel G. Pesante

INTRODUCTION

The Africanized honey bee will find its way into the Caribbean. Island hopping from South America or from North America via the Caribbean, although a direct flight is unlikely, accidental and deliberate introductions should be of main concern. Upon colonization the Africanized honey bee will negatively affect the local apiculture industry. However, once the beekeepers and the community become educated about this honey bee significantly positive results may be obtained.

MANAGEMENT CONSIDERATIONS

Various interacting factors must be examined when dealing with the Africanized honey bee. Of main concern to the public is the defensive nature of this honey bee which reacts ten times faster than its European counterpart. This factor, although real, has been greatly exaggerated by the media; nonetheless, this issue must be addressed as accidents have occurred. It is highly recommended that personnel of the local Firehouse be trained on how to deal with Africanized swarms and their disposal and to train a special unit in each Hospital on how to deal with a victim of massive stinging episodes.

Problems do arise from having beehives colonized by Africanized honey bees, but these involve almost exclusively the beekeeper. Hives must be relocated 200 metres from structures frequented by humans, animal shelters and away from roads and trails. The beeyard must be fenced, preferably with a thick tall barrier of bushes, forcing foraging flights above three or four metres. The beeyard must be well kept to minimize accidents which may cause a stumble resulting in the exposure of body parts. Hives should be placed one metre from each other, preferably on individual stands, although the latter is not imperative.

Additional protective garments are required to work an Africanized colony. These include heavy clothing under the coverall, a good veil and hat and protection for the ankles and hands. Great care must be exercised to avoid leaving gaps as bees will find their way into the suit. Work must be conducted in pairs, one person has to constantly smoke the colony being worked as well as adjacent colonies. Correct use of the smoke and smoker is of utmost importance in working Africanized honeybees. Small amounts of smoke must be continuously applied to all exposed parts of the colony.

One or two colonies in the beeyard may respond defensively in an extreme way, these in turn arouse other colonies. It is importamt to identify these colonies and requeen them with a more gentle genotype. Selection of more productive and less defensive bees is possible and highly recommended.

BIOLOGICAL CONSIDERATIONS

Higher swarming rates account for a significant portion of the ability of the Africanized honey bee to colonize new areas. Their colony may cast as many as thirty swarms in a year, greatly increasing the chances of saturating the area with the Africanized genotype. Aside from these swarming episodes, small swarms the size of a large fist, accompanied by two or more mated queens, may arrive in the beeyard and take over queenless colonies.

Differences in mating behaviour have been shown to influence the ability of this bee to dominate an area with the Africanized genotype. Drifting Africanized drones are cared for in European colonies whereas European drones are eliminated upon arrival into an Africanized colony. This increases the probability of virgins mating with Africanized drones.

Africanized drones tend to fly 12 to 20 minutes after European drones but there is an 80% overlap in flying times making this an unpractical management tool. More important, flooding an Africanized area with European drones has yielded very encouraging results as attempts to mate European virgin queens have yielded a progeny more than 90% European.

Africanized honeybees are hybridizing at two geographical areas, in Argentina, and in Mexico and Southern USA. This seems to be the result of environmental pressures exerted on the population as the bee reaches possible climatic boundaries in Argentina. The other effect has been the large number of European colonies encountered by the Africanized bees in their migration path through the Yucatan Peninsula. Swarms captured in the USA are requeened to delay Africanization of the USA honeybee population.

HONEY PRODUCTION

Conflicting data have been reported by various authors on honey production by Africanized colonies. This indicates there may be an interaction in honey production with environmental conditions. On a local scale, honey production differences have been detected with increasing number of years after colonization. This is the result of a better understanding of the bee biology and management and direct and indirect genetic selection by the beekeeper. Moreover, there is honey being produced in areas previously devoid of honeybees. Africanized honeybees will not compensate for honey comb thickness when eight or nine frames are placed in the super. Ten, possibly, eleven frames should be placed in the super to offset this comb construction behavior.

POLLINATION

Africanized honeybees have a higher number and ratio of pollen collecting bees in the field. This implies they could be better crop pollinators than European bees (not considering their defensive behaviour). On the other hand, the flower data show they spend less time working a flower than European foragers. This is an area that requires more research.

SUMMARY

Beekeeping practices become more involved and expensive after Africanization, causing many hobby and commercial beekeepers to abandon the industry. Nonetheless, a new wave of beekeepers usually gets involved and have in many cases generated a better structured apiculture industry than before. However, Africanization should be avoided or delayed as long as possible.

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THE NEED FOR BEEKEEPING LEGISLATION IN THE CARIBBEAN

by

Abudu Jaima

I would like to give thanks and praise to the creator for the breath of life. Breath in the form of oxygen is generated by the plants of the earth. Bees impact 95% of all world plants through Pollination. The human family therefore, is totally dependent upon bees and trees.

We who have chosen the craft of the study and raising of bees have a great responsibility. The work we do to establish draft legislation for the protection of our region will affect not only the generations of today but the generations of tomorrow.

Introduction

We live in an era of increasing protectionism. Expanding populations, scarcity of resources, diminishing finances are but some of the many international influences which make it imperative for all people everywhere to efficiently manage their resources in ways which will ensure not only their own survival but the quality of the heritage which is bequeathed to those who will come after us.

An increasingly popular tool of this efficient management is protectionism. In terms of global trends and influences it is of extreme significance that this beekeeping workshop, convened in 1992, has on the agenda the need for beekeeping legislation in the Caribbean. 1992 is undoubtedly the most important year in this century with regard to the deliberate and programmed closer collaboration and cooperation among the greater economic powers of the world. Though this growing collaboration has included social, political and cultural issues, its primary focus has been on matters related to food and its implications for survival and future security.

The strengthening of the European Community in this regard must stand as the seminal example. There cannot be many of us who are unaware of the reaction which this has provoked in the Caribbean.

Ladies and gentlemen, bees are vital to the survival of the human family. Yet beekeeping is not fully appreciated by the overwhelming majority. Its by-products have been sought after for a variety of reasons and circumstances. And yet ironically, so little is known by the general public about the field itself. So much is taken for granted that not enough legal attention has been directed to its protection. Where legislation does exist, no attention has been placed on its enforcement.

I propose for the remainder of this presentation to briefly outline the uniqueness of the beekeeping industry in the region, to identify some of the

circumstance which place it at risk, to examine the present status of the legislation which exists as a basis for identifying what we need, and finally to make a recommendation as to the possible mechanism which could be utilized for achieving our objective.

The Unique Features of Beekeeping in the Region

The Caribbean region has been identified as the focal point for international research in beekeeping for the next five years. That should tell us something. In this region, beekeeping, where the term is even recognized, is generally perceived outside of beekeeping circles as a hobby, a curiosity. And yet, we have international organisations willing to commit human, financial and other resources, to its systematic investigation, in order to collate old facts, discover new ones and reach scientific conclusions.

If our industry is of such significance to the rest of the world then it amplifies our obligation to take more than a second look at it. To say that our industry is environmentally friendly and enjoys the attribute of being easily integrated into Agro-forestry projects is an understatement. Let me emphasize environmentally friendly, in an age of deteriorating environmental conditions and frantic efforts to reverse these destructive trends. We actually have an industry which enhances the environment. Reflect for a moment on the contribution of beekeeping to the enrichment and preservation of global environment.

While the sub-region has comparative production disease-free advantages, the risk of losing such advantages is growing with the increasing importation of bees, honey, sub-products, beekeeping inputs and the growing risk of Africanization of bee populations via travelling swarms. So, we see, that while we are exposed to the disease which some wayward traveller may bring in we also may invite some of them in through the kind of importation mentioned above.

We must add to these the role of the hobbyist who fills out a form and sends it off to Great Britain or the United States, or anywhere else in the world, and then after a few weeks collects his bees in the mail.

In a combination of many ways, bee-borne diseases and parasites such as Verorra, Trachea mites, foulbrood can enter our shores. Certainly, they threaten the industry. But since we are aware of the potential of bees for increasing and enhancing productivity in certain agricultural endeavours, we can understand the implications that a deteriorating bee industry would have on a variety of cash crops and the consequent fate of the small farmers, women and youth who are engaged in such activities.

If we fail to adequately protect the beekeeping industry we are actively contributing to the potential disintegration of agro-forestry in the region and the disintegration of the human family on the whole. In other words, we would fail to live up to our obligation.

Existing Legislation

There is no definitive conclusion which can be made at this stage regarding the existing legislation in the region, in respect to the industry. An initial check reveals that laws have been enacted as early as 1912, in the case of Jamaica, and as late as 1986, in the case of Antigua and Barbuda.

The initial investigation also reveals a lack of uniformity in the issues addressed by the various pieces of legislation. The Trinidadian law (Annex 2) is certainly more far-ranging in the number of issues addressed, than is the Jamaican legislation.

Not all the territories have enacted legislation but we managed to identify legislation existing for Jamaica, Trinidad, Belize and St. Vincent and the Grenadines.

The case of Antigua and Barbuda warrants special mention. There is no law in this territory relevant or specific to the beekeeping industry. Law number #34 of 1986 dated November 12, 1986 is entitled: The Animals (International Movement and Disease) Act 1986. It covers a number of important topics including: The Importation of Animals and Animal Carcasses, Quarantine, Powers to Arrest and Search and includes a list of fifty-seven diseases against which the legislation is designed to grant protection. There is no mention, however, of any of the diseases which are bee-borne. As a matter of fact the law is explicit in its exclusion of "Bees" from its interpretation and from its definition of "Animals."

If the existing legislation indicates one thing, it is that there is no unified position on or appreciation for the social, economic and environmental value of the beekeeping industry and the need to grant it the strongest possible legal protection.

What is needed

In simple terms, the region is in need of legislation which will not only protect the industry from imported diseases and pests but will address issues which will ensure its growth and development, improve its management and halt and prevent future destruction of bee pastures.

The legislation must form part of the overall management of agro-forestry resources and should charge agencies and institutions which impact even marginally on these resources with its enforcement. As an example, the legislation must empower port and airport authorities to specifically check vessels and parcels for swarms and parasites which can invade the environment and impact negatively on the beekeeping industry.

The variations in the existing legislation suggest that there is need for the harmonization of these laws.

In so far as no legislation exists in some territories, there is also a need for some intermediate policy which is immediately applicable.

Ladies and gentlemen, the need is urgent. Consider the benefits to our environment and the agricultural sector. Consider too that the region will be the international focus of bee research over the next five years. All of which make it imperative that we exert all possible means to protect our industry, ourselves and our future from destructive influences which may be unknowingly or indiscriminately introduced into unsuspecting territories.

The mechanism

This region has two integration movements - the Caribbean Community commonly called CARICOM and the Organisation of Eastern Caribbean States, the OECS.

These organisations are mandated to focus on issues related to the economic development of the region. Their members are thirteen former colonies of Britain. They cover at least ten other Caribbean territories with whom they relate as applicant members or as observers. These include, the BVI, the French Departments of Martinique and Guadeloupe, Haiti, Cuba and Venezuela. A wide cross-section representing the geographic, ethnic, socio-cultural and linguistic diversities as well as the economic commonalities of the people in this region.

They also interface with IICA, the Caribbean Agricultural Research and Development Institute (CARDI), the Economic Commission for Latin America and the Caribbean (ECLAC), Organisation of American States (OAS) and a host of other regional and international organisations whose objectives have implications one way or another for the operations of regional beekeepers.

I am proposing, therefore, that in order to advance the objectives of this workshop within the context of their benefit to regional development, we inform the standing committees of Ministries with responsibility for Agriculture of both CARICOM and the OECS of the conclusions of this workshop.

I propose further that in informing them thus, we request that the urgent need for relevant legislation such as has been outlined be delegated to a working party and that working party be mandated to report to the Standing Committee of Ministers of Agriculture (SCMA) or the relevant Directors of Agriculture at both the OECS and CARICOM Secretariats on a draft legislation for the region which can be speedily implemented.

PRESENT SITUATION IN RESPECT TO CONTROLS, ORGANIZATIONAL STRUCTURE AND ON-GOING ACTIONS IN THE ORGANIZATION OF EASTERN CARIBBEAN STATES (OECS)

by

EVERTON AMBROSE

INTRODUCTION

An important consideration in the expansion of agricultural production is the role of insect pollinators. As these insects fly from flower to flower, they pollinate many different kinds of flowers resulting in increases in yield and quality of seeds and fruits. Pollinating insects can broadly be divided into two groups, namely the wild insect pollinators over which man has little control viz. thrips, moths, butterflies, beetles, flies and the controlled group represented by honeybees. Besides their importance to the welfare of agriculture, honeybees are important in honey production and the production of other bee products. Thus, with the application of sound beekeeping practices, the colony's population is within the control of the beekeeper and honeybees can be produced in larger numbers and placed in any desired location for maximum benefit.

However, the efforts of the beekeeper will be fruitless if it is not supported nationally. The indiscriminate use of pesticides in crop production is just as destructive to beneficial insects as it is to pests and diseases. Additionally, honeybees must be protected from exotic pests and diseases if the benefits of beekeeping can be obtained.

PRESENT SITUATION

Controls

There is a general consensus in the sub-region that beneficial insects including honeybees must be protected. In fact, there is a general consciousness toward environmental protection. In most countries the Minister of Health has the portfolio of the Environment. In some countries there are specific groups who demonstrate environmental concerns publicly.

In the early 1970s, the countries in the Organisation of Eastern Caribbean States (OECS) enacted legislation for control of pesticide use and importation including provisions for Boards of Management. However, it was not until the 1980s that specific actions in pesticide control were initiated. Support for these actions have been provided by the Inter-American Institute for Cooperation on Agriculture (IICA) through its Plant Protection Project in the sub-region, the Caribbean Environmental Health

Institute (CEHI) and the Food and Agricultural Organisation (FAO). Actions include training of specific target groups including farmers, technicians of the Ministries of Agriculture and Commodity Associations, personnel from Customs, Port Authority, Fire Service and distributors of pesticides; development of regulation; establishment of Pesticides Boards and the provision of a forum (annual meetings) where the Boards of all the OECS can meet to discuss the status of and the harmonization of pesticide management.

In the Windward Islands, aerial application of fungicide is a major activity for disease control in bananas. The fungicides used are not normally toxic to bees although the oil carrier is toxic to them. Insecticides are not normally applied from the air but occasionally in the urban area fogging of the insecticide malathion for mosquito control is undertaken.

The objective of quarantine controls, in this instance, is to protect bees from exotic pests and diseases. The honeybee, like other animal and plant life, is menaced by pests and diseases. Fortunately, present knowledge indicates that there are no major bee pests or diseases in the OECS. However the Africanized bee is active in Trinidad and European Foulbrood has been identified in Guadeloupe. In countries where there is no organized control method, the introduction of a few pests or diseases could make beekeeping uncertain or impossible. The quarantine of bees and bee products is not organized in most countries of the sub-region. There is no specific legislation governing the movement of bees or bee products in any of the OECS countries. In these islands quarantine for bees is governed by the Plant Protection Act, in those countries where it exists. Through efforts of IICA and FAO, Plant Protection Acts, based on a model developed by FAO, exist in Dominica, Grenada and Saint Lucia.

Within the OECS the entry of bees as live beneficial insects can be authorized by the respective Minister through Plant Protection Officers but only under conditions as may be prescribed. A health certificate is required from the agricultural health authorities of the exporting country. The Comptroller of Customs is required to notify the Plant Quarantine Services of the arrival of the materials.

Within the OECS, there are no quarantine controls for the importation of honey and other honey products or used beekeeping equipment. Honey is controlled through trade licences issued by the Ministry of Trade.

Organizational Structure

In Dominica, Grenada and Saint Lucia, Pesticides Control Boards (PCB) have been established to monitor the importation and use of pesticides. The Boards have no staff and where pesticide inspectors exist they are operating on a part-time basis. The Boards receive very little, and in some cases no, finance.

The present quarantine organisational structure varies from country to country but follows the same model. In Grenada and Saint Lucia, there are Plant Protection Boards to manage quarantine. The inspection system is based on what is internationally acceptable and practically feasible. The implementation of effective quarantine controls depends on the degree of cooperation with customs. In some countries, for example Grenada, the main port is manned full-time whilst the other ports are visited regularly. In Saint Lucia and St. Vincent and the Grenadines, regular visits to ports are made by the Quarantine Officers. Visits are also made upon request.

Ongoing Action

Through the OECS Pesticides Boards Network, efforts are being made to re-activate the Pesticides Control Boards in St. Vincent and the Grenadines and to encourage the establishment of a PCB in St. Kitts/Nevis and Montserrat.

Also the Acts are being revised to include other toxic chemicals and regulations are being developed based on these Acts.

Plant Protection Acts are being written in Antigua and Barbuda, St. Vincent and the Grenadines and St. Kitts/Nevis as part of a project financed by FAO. In Dominica, an Act is to be structured along the lines of the Trinidad and Tobago Act.

IICA through its Plant Protection Project in the OECS is accessing legislation on control of bees and bee products to develop a model Act for the countries in the OECS.

MANAGING NUTRITIONAL RESOURCES FOR HONEYBEES

By

Malcolm T. Sanford

Introduction

A large part of the beekeeper's technique in caring for a colony of honeybees is to help manage the nutritional resources of a colony. This is much easier said than done. That is because the bees are actively foraging in the field under most circumstances and their nutritional status is often not apparent to the beekeeper. It is impossible to measure exactly the nutritional inputs needed by and/or being provided to colonies because bees operate in an "open system," over which the beekeeper has little control.

The practical result of not knowing exact nutritional status is that the beekeeper must learn to "think like a bee," using his/her experience to judge when colonies are stressed because of nutritional insufficiency. Often this translates into "hefting" a colony by the beekeeper to determine its weight and attempting to correlate this with the number of adults in a colony. If there is any doubt, the beekeeper supplements the colony's food, usually by feeding sugar syrup. There is, however, another part of nutrition, that of protein provided by pollen, responsible for producing young bees so necessary to a colony's continued survival. Thus, both carbohydrates and proteins must be taken into consideration by the beekeeper when assessing a colony's nutritional status.

Managing Carbohydrates

The principal carbohydrate source for honeybee colonies is nectar from the flowering plants with which the insects evolved. The major sugar in nectar is the disaccharide, sucrose. This molecule is split by means of enzymes added by honey bees into its components, the monosaccharides, glucose and fructose. This "inversion" of sucrose results in a highly saturated sugar solution (less than 19% water) which is stable, prevents growth of many micro-organisms (yeasts, molds) and resists crystallization.[1]

Energy from carbohydrates powers adult bees. If it is in short supply, the colony cannot adequately collect nectar and pollen to sustain its activity. Thus, the first job of the beekeeper is to determine where bees should be located to maximize their collectable resources. Traditionally, this has been done by deciding through experience where colonies do the best, usually measured by honey production.

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[1] For more information see, J. Trumpeter. 1981. "Clarifying Some of the Myths and Confusion About HFCS, Sugar and Honey," American Bee Journal, Vol. 120, No. 12, pp. 857-863.

The fact that honeybee colonies are perennial, functioning in practically all seasons and climates, means that the insects can take advantage of a wide range of plants. This is the reason a flourishing apiculture is found in almost all areas of the world. Although a wide variety of plants is available to bees, in practice most honey-producing areas are supported by a few major nectar-producing plants. Typically, tropical areas have a wider range of plants which honeybees can use than that found in more temperate zones.

Lists and descriptions of plants important to bees in the tropics, including the Caribbean, have been published.[2] Each island nation, however, will probably have a particular plant mix which the bees use. It is up to the beekeeper as he/she develops experience to determine what plants are important for bees. Within this context, it must be recognized that interaction between plant, soil type, climatic conditions and other variables is often different in localized areas. This sometimes makes recognition of a plant's importance to honeybees more art than science.

Fortunately, honeybee colonies can be fed carbohydrates. Most authorities would agree that at least two frames of stored honey available to a colony at all times are necessary to keep nutritional stress to a minimum. Perhaps the best bee food is full frames of honey. Lacking this resource, beekeepers have successfully fed bees cane sugar syrup (1:1 ratio sugar/water by weight), candy or sugar in dry form. [3] Both cane and high fructose corn syrup (HFCS) prevent starvation and stimulate population build up in honey bee colonies. The usual rule of thumb is that once feeding begins, it should be continued until the bees stop taking it.

Managing Protein

Because bees are vegetarian, their source of protein must, like nectar, come from a plant source. It is well known that all pollen is not nutritionally the same. This is one of the main reasons there is confusion about the human consumption of bee-collected pollen. Pollen can vary dramatically in protein content. Pine pollen contains less protein than that of other plants; some authorities believe it may even be detrimental to colonies. On the other hand, pollen of fruit-bearing trees has a rich protein content.

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[2] Ordetx, Gonzalo S. 1953. Flora Apicola de America Tropical, La Habana, Cuba: Editorial Lex. See also the Bibliography of Tropical Apiculture, International Bee Research Association, 18 North Rd., Cardiff, UK CF1 3DY, Tel: (+44)222-372409 Fax (744) 222-665522. Internet: MUNNPA@CARDIFF.AC.UK

[3] T.S.K. and M.P. Johansson. 1978. "Feeding Sugar to Bees," Some Important Operations in Bee Management, International Bee Research Association.

It cannot be assumed that bees actively collecting and storing pollen have adequate protein resources. The bees themselves are also sometimes incapable of detecting what is nutritionally sound. During times of pollen dearth, the insects might be seen collecting sawdust or dry food meant for other farm animals. Because little is known about protein content of specific pollens, especially in the tropics, the best rule of thumb is to ensure that honeybees consume a pollen diet from a variety of sources. Like nectar-secreting plants, a wide range of pollen-producing plants is also available to honeybees and has been catalogued for the tropics.[4] Monitoring the amount of protein available to a colony is not an easy task.[5] As a general rule, at least one full frame of stored pollen should be available at all times for a colony of honey bees. Other variables such as placement of stored pollen within the colony and the relative value of fresh bee-collected pollen versus "Bee bread" (stored pollen preserved with lactic acid), are not well understood. One sign of protein deficiency is removal of brood in the pupal stage by bee colonies. Young drone and worker brood may also be consumed by bees when they sense a protein shortage.

Bees short of protein may be fed pollen supplement/substitutes. The classical definition of a pollen supplement is an artificial diet with some percentage of pollen added. The pollen stimulates the bees to consume the diet. A substitute is a totally artificial diet. Commercially prepared supplements/substitutes are available from bee supply houses. It is also possible to make an artificial diet using expeller processed soybean flour with fat content of 5-7 percent (higher fat content is toxic to bees), brewer's yeast (Saccaromycs sp), Wheast (R) or whey yeast (Saccharomyces fragilis), and torula yeast (Candida utilis). The following diets have been tested by the U.S. Department of Agriculture bee laboratories in Tucson, Arizona; Madison, Wisconsin; and Beltsville, Maryland.[6]

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[4] See previous footnotes.

[5] Australians have chemically tested bees for protein over many years. See: Kleinschmidt, G. and A. Kondos. 1979. "Colony Management on Low Quality Pollens." Australasian Beekeeper, Vol. 81, No. 1, pp. 5-6.

[6] L.N. Standifer, F.E. Moeller, N.M. Kauffeld, E.W. Herbert, Jr. and H. Shimanuki. 1978. Supplemental Feeding of Honey Bee Colonies, Ag. Information Bull. No. 413, June.

Protein Source	Parts by weight Dry Mix	Patty
Supplement Formula #1		
Soybean flour:pollen (3:1 weight/weight)	1	
Sugar:water (2:1 weight/weight)	2	
Supplement Formula #2		
Wheast (R) or brewer's yeast:pollen (3:1 weight/weight	1	
Sugar:water (6:1 weight/weight)	2	
Substitute Formula #1		
Brewer's yeast	2	3
Sugar	3	3
Water (to make a dough-like consistency)		2.5
Substitute Formula #2		
Soybean flour	2	3
Sugar	3	3
Water (to make a dough-like consistency)		2.5
Substitute Formula #3		
Wheast (R)		3
Sugar		3
Water (to make a dough-like consistency)		4

Supplements with pollen added will almost invariably be better accepted by bees. Pollen obtained from an unknown source must not be fed to bees; it can be a vector for most brood diseases.

Pollen pellets should first be dissolved in water (one-third gallon of water/pound of pellets). Sugar is then stirred in followed by the soybean flour, Wheast (R), Brewer's or Torula yeast. Finally, for patties, water is added to make a dough-like consistency. It will take some experimenting to adjust the water based on environmental conditions. Cakes of diet of about a pound and a half are wrapped in wax paper to retard drying and placed on top of the brood nest. Cakes should be replaced before the previous one is consumed; about every week or 10 days. It is important that once colonies are fed, they continue to be fed until abundant pollen is found in the field.

A pollen substitute has been developed using both yeast and lactalbumin. This is commercially available as the Beltsville Bee Diet (R), named for the laboratory that developed and tested the recipe. Results using this commercial preparation are mixed. This is the case for many other artificial diets as well; the reason supplements are usually preferred by beekeepers.

HIVE PRODUCT DIVERSIFICATION AND MARKETING OPPORTUNITIES

By

Jorge Murillo-Yepes

Introduction

The whirling changes that characterize the world economic realities over the past decade have, in a somewhat forceful manner, caught the attention of the regional decision makers in reference to imperative need to modify production systems in tune to the current economic order. During the last few years the region has been engaged in the design and implementation of an agricultural diversification thrust, which is expected to afford the economic, social and ecological elements required for survival and development in the challenging upcoming 21st century.

The notion of hive product diversification infers three main elements. The first of these is the overall intensification of production by means of increased productivity, and by adding value through further processing. Implicit in this is the production of alternative commodities from the primary raw materials. The second element is the increased production of hive products and by-products for national and regional consumption. The third element is the increased production of traditional and non-traditional hive products and by-products for export to international markets.

The potential benefits of hive product diversification to Caribbean beekeepers, in particular, and national and regional economies, in general, are closely linked with the following socio-economic topics: foreign exchange savings and earnings, employment generation, creation of production linkages, food security and rational exploitation of underutilized resources.

Harvesting honey is the primary goal of beekeeping today, as it has been in the past. Published data present an annual global harvest of some 1 million tonnes, worth about 1 billion US dollars on the world market. No systematic statistics are collected for any other hive product, none of which is likely to reach 5% of this value, and no significant data has been released in regard to regional production.

The total world honey output has kept a pace with global population growth. Conversely, international trade in the commodity (and other hive products) is expanding much more rapidly as a result of a steadily increasing demand, particularly is the industrialized countries.

Nevertheless, economic returns currently obtained by regional beekeepers for their relatively small production, are several times higher than the prices offered on the international trade, posing an element of disincentive for extra-

regional marketing of honey surpluses, and in some cases, for the establishment and/or expansion of apiaries.

The Caribbean region, with its intrinsic geographical and ecological characteristics, its vast floral diversity and an almost totally bee pest and disease free status, presents excellent conditions for the production of prime quality raw materials. Beekeepers and hive product processors can successfully offer a variety of products to specialized markets, as long as those products are marketed in close adherence to the highest standards of quality maintenance and presentation.

Primary Hive Products

Honey

Honey has been ingrained in the Caribbean culture throughout most of its historical period. It is highly regarded for its medicinal properties and has even been assigned aphrodisiac powers.

In general, regional consumers prefer dark honeys and, as is so often the case, no particular attention is paid to quality, foreign matter, packaging, labelling or general presentation. This product is traded mostly in recycled rum bottles (26 fluid ounces) and currently fetches wholesale prices ranging between EC$9 in Grenada to as much as EC$25 in Montserrat and Nevis. Prices received by St Lucian beekeepers in Martinique and Guadeloupe in 1990 were on the order of EC$42 per bottle.

Some cases of diversification have been registered in the last couple of years in terms of presentation, by the offer of smaller plastic and glass bottles of 12 and 16 fl oz. In some islands, a few beekeepers are also offering small amounts of "honey bears" (12 fl oz) attractively labelled.

With few expectations, this commodity is marketed at the local level, mostly in liquid form, and it appears that demand is sufficiently supplied at present only in Grenada, with all other territories registering a deficit in production or importation.

This situation presents in itself very advantageous potential marketing conditions, as the promotion of honey as food and not only as medicine, could open a whole field of trading activities. Special attention, however, must be given to the supply of a product of standard quality and presentation, in order to be considered by the consumers as an item to be present on their tables on a daily basis.

Comb honey is sold sporadically in some islands, generally being the object of great demand, although its presentation in some cases leaves a lot to be desired. Crystallized, or "creamed" honey is seen rarely at supermarkets, all of it imported from extra-regional sources.

The processing of surplus honey also presents a wide range of possibilities. The production of Mead (honey wine) with its multiple variables, vinegar, beauty products, and others, could significantly increase income for the beekeepers.

Although in industrial countries the baking industry is the largest user of honey, this is not the case in the Caribbean. Use of honey imparts moisture retention due to its high fructose level, yielding a desirable degree of browning and a flavour unobtainable elsewhere. Breads, cakes, yeast-raised sweet goods, and cookies, are all improved by honey.

Other diversification possibilities exist through the utilization of honey as an ingredient in the manufacture of peanut butter, ice-creams, yoghurts, salad dressings, honey butter, and many others.

Beeswax

For the majority of regional beekeepers beeswax is a hive by-product which goes underutilized: some may use it in small quantities in their smokers to propitiate slow but reliable combustion, some may give or sell small blocks to cobblers, a few candles are made, some is sold to the batik industry, some is thrown away.

Beeswax has been for centuries a very valuable commodity for the Catholic Church in the form of liturgical candles, but, for the most part, the cosmetic industry is the biggest user of the product, followed by the beekeeping industry itself, for the manufacture of foundation sheets.

The production of natural beauty products, polishes for wood and leather, and the utilization of beeswax in the batik and metal casting industries, provide some avenues for rational use of this important hive product.

Candle making and the production of foundation appear as the easiest ways to provide additional income from hive products for the regional beekeepers. Theoretical work has been done for the production of a "mosquito repellant" candle, by the impregnation of the wick with ground mosquito coils, which would provide a dual service to the consumer.

<u>Non-traditional Hive Products</u>

Pollen

Significant marketing leverage can be obtained by the promotion of "Island Pollen" in international health markets. The characteristic bio-diversity of the Caribbean countries, the virtual chemical "unspoiltness" of the territories, and the mystique assigned to this part of the world, offers a practically virgin marketing field for regional beekeepers.

Pollen has gained tremendous acceptance in international markets for its purported cell-building properties and the demand has increased at an accelerated pace in the last five years.

Pollen can also be utilized as an ingredient in the manufacture of beauty products, soaps, and is an excellent additive in the production of mead and fruit wines, as yeast nutrient, replacing advantageously the inclusion of chemical nutrients.

Propolis

Another example, of a hive product considered regionally as "refuse" or a "nuisance", propolis has been used for centuries in Central Europe as an important antibiotic element, a fact that more and more, is the object of scientific tests and medical reports.

Currently, propolis is utilized in the preparation of beauty products, toothpaste, soaps, acne treatments and many other hygienic commodities.

Royal Jelly

Considered by many around the world as the perfect aphrodisiac, royal jelly production in the Caribbean has been the object of only a few academical discussions.

Whilst the commercial production of this commodity requires a higher than prevalent technical level and some specialised equipment, royal jelly production could become a significant income provider for dedicated beekeepers in the region.

Royal jelly has many uses in the pharmaceutical and beauty industries.

Bee Venom

Bee venom is perhaps the most highly priced of all hive products due to the great imbalance between supply and demand. It is used by the pharmaceutical industry as antihistaminic, antiallergenic and others.

The production of bee venom on a commercial scale presents obvious difficulties for the regional apiarists, not only in terms of the technical capability and equipment required, but most important, by the very serious effects that the harvest of this product can have in the area where it is practiced, due to the highly magnified defensive behaviour intrinsically triggered by such hive manipulation.

Bees

Live bees can offer another source of income to regional beekeepers, in the form of queen and bee package production for local, regional and international markets.

Queen and package (nuclei) production may become in the near future an important economic factor for beekeepers, in light of the pest and disease infestation currently experienced in North America and Europe.

The commercial production of homogenized drone larvae (apilarnil) as a proteinic ingredient of fish and shrimp diets may also be considered as a potential economic activity in the regional apiaries. Similar consideration can be given to bee larvae as an ingredient of specialty human food products.

Although of little practical application in the agricultural conditions presently prevalent in the region, the utilization of migratory bee colonies as means of pollination, is an important economical activity for many apiarists in several parts of the world.

QUEEN REARING IN THE CARIBBEAN

By

Laurence Cutts

First, I would like to thank IICA for organising this meeting and inviting me to participate.

I am a third generation beekeeper, my grandfather started keeping bees in 1989. My family has been in the bee business now for 103 years. I was virtually born in a bee yard. I was nearly stung to death when I was two years old from poking a stick in the entrance of a beehive in the back yard. I have been stung more than a thousand times in one day so my blood is probably half bee venom.

I have kept bees all of my life, running as many as 2,200 hives for queen and package production, shipping mostly to Canada. My family shipped queens and bee packages to Nova Scotia and Prince Edward Island for over 65 years until we were put out of business by the tracheal mite quarantine. We produced around 10,000 queens and 5',000 packages of bees in about a two month season in the spring.

I have always had a love for bees and beekeepers. For some reason, beekeeping seems to attract independent individuals. It is a hobby or profession in which you can be very independent. You can pretty much do things your way. Beekeepers have traditionally hated regulations because they interfere with this independence. I was always a beekeeper until seven years ago when I took this job and became a regulator. Now beekeepers get upset with me because I interfere with their independence.

Most of these islands have some of the cleanest bees in the world. When I say clean, I am referring to disease and pest free. If they are to be kept that way, regulations will be required. Beekeepers may have to give up some of their independence. You need to be aware that this may be part of the price you will have to pay to keep your respective islands free of pests and diseases.

Before I get into my topic of "Queen Rearing In the Caribbean", let me say a bit about marketing your honey. First, I would like to admonish you to be extremely careful about how you harvest your honey. I do not want to upset anyone or hurt your feelings, but I believe that half the honey I have seen in the Caribbean could not legally be called honey. It is too thin. Honey that contains more than 18.5 percent moisture cannot legally be called honey on the world market. We have this problem with much of the honey produced in Florida, especially in wet seasons. It seems to be a problem inherent with much of the honey produced in the tropics. I would advise you not to harvest any honey until it is at least 9/10 sealed. Even then it may sometimes be thin.

The second thing I would advise you to do is to cater more to the tourist trade. I have told Quentin Henderson on Nevis that the prices they are getting from the tourist trade are pure highway robbery. Do not get me wrong, I am all for it. I believe you should go for it even more. Some of these islands do not have a big tourist trade, but some have a market that is not being met and some of the prices are unbelievable. Go for it.

Now for "Queen Rearing In the Caribbean"! Queen rearing is the art and science of producing new queens. They are produced by the bees as a result of the art (skill) and science (knowledge) applied by the queen producer (beekeepers). What we wish to discuss today are some of the things that will be involved in raising queens on a commercial scale in the Caribbean. First, I want to tell you, you have good stock on these islands. Please do not jeopardize it by trying to import new stock. If some islands do not have good stock, get your stock from an island that does, not from outside of the region. Each island should have someone raising queens for their own needs as well as others on the island who may need them.

There has been some mention of utilizing a smaller island that does not currently have bees as a breeding ground for selected stock. That could be possible. However, the USDA undertook a queen breeding project in the late 40's and early 50's on Kelly Island in Lake Superior. Kelly Island had no bees and was 12 miles from the mainland. However the queens mated with drones from the mainland! So you will need an island more than 12 miles from any other. The reason the African bee has not gone from Trinidad to Tobago is due to the separation by thirty-four miles of water.

The production of hybrid queens has also been mentioned. It is very possible that the bees of some of these islands have become distinct line bred strains. If so, and you took queens from one island and mated with drones from another, you could possibly come up with a very good hybrid without the use of instrumental insemination.

Export of queens has been mentioned. Let me say again that I think you should start off small and produce queens first for your local market and then perhaps for a regional market before trying to consider the USA or Canadian market.

I do not know what it would take to export queens into the Canadian Market. In the USA, you would have to be inspected by the USDA and found to be disease, pest and African bee free. Then you would have to have a quarantine mechanism with sufficient enforcement to assure that you will stay that way. The individual producer would then have to have his whole operation inspected and certified by a qualified inspector. It would be impractical for most Caribbean nations to try to hire and train an inspector. There is a possibility that something could be worked out the USDA, the Florida Department of Agriculture, Puerto Rico or Trinidad for a qualified inspector to come over for a week or two to do the certification. Or you may be able to hire a regional inspector to service several islands, sharing the costs between them.

It would also take a change of USA law before shipments of queens could be made to the USA. Once the African bee becomes more established in North America, I think that should not be very difficult.

A major consideration is cost. I can not tell you what it will cost to produce a queen in the Caribbean. My Daddy always said that a queen, 10 lbs of honey and one pound of bees were of equal value. I know you will probably spend as much time and effort producing a queen as you would ten pounds of honey. At that rate, a queen on some of these islands would be worth over $50.00 US. Of course, the prices my Dad referred to were wholesale bulk prices. Although that would bring the price down considerably, it would still be considerably higher than in the USA. A good young queen should produce at least 25 or 30 lbs more honey per hive, otherwise she is not worth bothering with.

It will take 100 hives to make up 1,000 nuclei over a four to six week span. (A nuclei is a small hive of bees used for mating queens). A small commercial enterprise raising queens for export should produce at least 3,000 nuclei. A large enterprise will run more than 10,000 nuclei and would need more than 1,000 hives to start up.

One hive will produce or build about 25 queen cells every four days. It will take about twenty of these cell builders (very strong hives used to build cells) for each 1,000 nuclei. You would also need four to five breeder queens per 1,000 nuclei.

All commercial queen breeders use the Doolittle Method for rearing queens. It was named after the man who developed it. Once a friend was visiting from Germany and was watching my oldest son Larry in the grafting house. He remarked, "oh, you use the Doolittle Method". "Do little my foot, we do a lot". Larry replied. He did not know that he was using the Doolittle Method.

The Doolittle Method involves grafting queen cells, (an experienced grafter can graft 600 cells an hour), cell starters or swarm boxes for the first twenty-four hours and cell finishers or builders for the final nine days.

Once the cell is produced, you have to have mating nuclei and good mating weather. One of the big problems they are having in Hawaii with queen rearing is excessive wind. They try to establish operations in valleys between mountains, but they still have problems with too much wind. It blows all the time. Hard! That may be a problem with raising queens here in the Caribbean. We know that queens can mate here successfully as indicated by the wild swarms on almost all these islands. The question that must be resolved is: Can queens be mated on a regular basis? They also had wild swarms surviving for centuries on Hawaii.

Although there are hundreds of variations in the methods to raise queens, there are some basic necessities. First, you must have strong hives. Write that down, underline it, circle it and put three exclamation points after it. It cannot be stressed too much, you must have <u>strong</u> !!! hives. You must have incoming nectar. If it is not coming from flowers, you will have to make it available by seeding. And you <u>must</u> have sufficient pollen. It do not think that

will be a problem here in the tropics since palms and coralita (or coral vine also called Mexican Creeper) are almost always in bloom and provide an excellent nectar and pollen source for raising queen cells. Although neither will make real high grade honey, they are good for raising queen cells.

Some of the problems that are likely to be encountered in queen rearing are stock (for instance, Canada may want a hardy winter stock; wind (I think it is less of a problem here than in Hawaii), transportation (some carriers may not handle bees), and expertise (currently, no one is experienced in queen rearing).

I feel that the time has come for queen rearing in the Caribbean. We just need someone to get started at it.

ADVANTAGES AND DISADVANTAGES OF BEEKEEPING ORGANISATIONS IN THE CARIBBEAN

By

Abudu Jaima

Beekeepers in the Caribbean have tended to function, for the most part, as independent individuals separate and distinct from one another. They have had little or no real linkages into the official agricultural machinery and minimum possibilities of benefitting from it while they continue to exist on their own.

As small-scale economic enterprises, in an industry which is still developing, they encounter the full force of the economic difficulties of any other small business organisation. Among these are difficulty in accessing funds for growth and expansion, limited access to training and research, inadequate marketing and promotional programmes and limited ability to maintain the relatively low level of production costs which are common to larger businesses.

These limitations only serve to amplify the threats to the survival of the industry on both a national and regional level.

There are beekeepers who recognise the benefits to be derived from greater organisation of and within the industry. At the same time, however, there is also a lack of will to bring about the required level of organisation. This is accompanied by inadequate understanding of the nature of organisation required, selfishness on the part of a few individuals and suspicion by others who have been led to believe that they would be exposed to exploitation and control which would be inimical to their interest.

However, the opposite is true, a number of real possibilities open up by forming an organisation on the national level. It would establish a body whereby equipment could be purchased duty-free. Training sessions and workshops could be organised and the exchange of information with regards to monitoring techniques and skill upgrading of the craft could also be enhanced. In addition to a central marketing house, a marketing scheme, could be developed and prices could be regulated. The fact that in Antigua and Barbuda the price for a 26 oz bottle of honey ranges from $12.00 to $35.00 per bottle amplifies the fact that there is no regularity within the marketing schemes.

Finally, there would be a clear distinction between the professional and the hobbyist beekeeper (the person most likely to order bees through the mail). As we know, these packages often come infested with Verora or Trachea mite or carrying the spores of American or European foulbrood. Both these pose tremendous danger to the Islands. Suddenly, we may find that the disease and pest free conditions that exist for the most part in the entire Caribbean, with the exception of Puerto Rico, Martinique, and Trinidad, are lost forever. Without organisation at the National level to (a) sensitize the government to the problems (b) monitor threats of pests and diseases and (c) to promote adequate

legislation, the disease free, pest free and Africanized bee free conditions will be short-lived.

Organisation on the regional level is even more imperative because the region is going to be impacted firstly by an International Bee Research Association Conference being convened in September 1992 in Trinidad. The threat of the total destruction of the bee industries of North American, Europe and Asia have caused these peoples in the North American continent and Europe to begin to look for other areas that can be developed with regards to beekeeping. Without a regional organisation in place the potential for our industry being completely taken over and dominated by Europeans and American is great. The potential for the incursion of diseases and parasites into the region is even greater. So it is necessary that we put in place a regional organisation that can address itself to the networking of information and training skills and also to protect, through legislation and the support of regional bodies, from the incursion of not only diseases but also entrepreneurs from the outside. Just as the other nation blocks have begun to come together with regards to economics and politics, the Caribbean region must do likewise. The priority is clearly agricultural. That being the case, it is important that we begin to come together as a regional body working towards the enhancement, upliftment, and enrichment of our total agricultural resources in order for us to survive politically, socially and economically.

The fact that 55 participants have come together here in Saint Lucia as a group representing 14 countries, and the level of excitement displayed during the workshop, amplifies the need for such a body. We must now harness the will to make it a reality.

Ladies and gentlemen, let us put the necessary mechanisms in place that will allow us to move forward with the protection, the enhancement, the development of positive marketing schemes, the providing of necessary equipment and modern technology and the proper exchange of information that is needed. This will not only allow us to present ourselves in a cohesive manner to the international conference convening in September, but help our region take the lead in apicultural development and effective marketing.

INFORMATION ON IBRA

By

Jorge Murillo-Yepes

What is IBRA?

IBRA is the International Bee Research Association, a non-profit organisation formed in 1949 and devoted to advancing apicultural education and science worldwide.

It works to:

- interpret and communicate information on bees and beekeeping to all who need it;
- promote beekeeping as a practical and sustainable form of agriculture for developing countries;
- act as a contact point and information exchange on beekeeping for governments, international agencies, research institutes, beekeepers and rural development workers.

IBRA is a registered charity and a company limited by guarantee. It relies for its income on membership subscriptions, grants, sales and income from services.

What does IBRA do?

IBRA provides the world's most comprehensive information network on bees and beekeeping.

IBRA publishes highly-respected quarterly journals:

- Bee World topical articles and reviews for beekeepers and scientists.
- Beekeeping and Development sharing news and ideas on appropriate beekeeping.
- Journal of Apicultural Research a wide range of original research papers.
- Apicultural Abstracts quick access to the world's beekeeping literature.

Our specialist mail-order service supplies current publications on bees and beekeeping - from our own publishing house and others. Our main library in Cardiff has a wealth of material on bees and beekeeping.

Conferences organised by IBRA bring together people with specific interests. Our conferences on apiculture in tropical climates, held since 1976, are the forum for discussing practical issues relating to beekeeping in the tropics. We also arrange meetings with other scientific organisations.

Appropriate beekeeping development is one of IBRA's special areas expertise, on which we provide an advisory service.

You can be part of IBRA

For an annual subscription you can enjoy the benefits of belonging to IBRA, as well as supporting the world's premier beekeeping information network.

You will also be:

- kept informed with Bee World;
- able to use IBRA's library in person or by post;
- offered special prices on our publications and information services;
- welcome to visit IBRA's headquarters in Cardiff;
- invited to attend, speak and vote at out annual general meeting, and nominate members to serve on IBRA's council.

Above all, you do not have to be an expert to join - just have an interest in bees and beekeeping, or a concern for environmentally sound development.

Membership Fee:

	£ UK	US$
- Individual	27.50	50.00
- Corporate	110.00	205.00

Subscription Fees:

	£ UK	US$
- Apicultural Abstracts	80.00	150.00
- Beekeeping and Development	11.00	20.00
- Journal of Apicultural Research	35.00	65.00

Address of IBRA:

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PROJECT PROFILE

DEVELOPMENT OF BEEKEEPING AS A SELF-SUSTAINING ECONOMIC ACTIVITY IN THE EASTERN CARIBBEAN

1. Justification

The interdependence of agricultural production and beekeeping has long been established and recognized. Some 90% of all world crops and plants are pollinated by bees. Managed bee pollination will increase crop productivity by as much as 60%. While producing hive products (honey, pollen, wax, wine, venom, genetic material, raw materials for cosmetics, among others) can result in a variety of self-sustaining economic activities for youth, women and farmers. Beekeeping is environmentally friendly and will enhance the overall forest environment.

While the potential benefits of efficient beekeeping are many, the industry in the Eastern Caribbean is in its incipient stage. Honey is the main and in most cases the only hive product taken by beekeepers. Even in the cases of honey, productivity is very low, on the average only about 30% (10 gallons/hive/year) of its potential. The low productivity and dearth of hive products can be traced directly to poor management practices at both financial and operational levels. This, in turn, is due to the non-existence of organised efforts to promote beekeeping as a business and the lack of efficient methods for transferring well known techniques and technologies to existing and potential beekeepers.

With few exceptions, the honey produced is in small volumes and is removed from the honeycomb using rudimentary and unhygienic methods and is packaged in a wide variety of recycled containers which do little to stimulate consumer demand. Although the quality of the honey produced in the West Indies is considered among the best in the world (acacia honey from Antigua won first place at an international competition in London in 1989), insufficient volumes and poor presentation have prevented West Indies honey from gaining a foothold in the international market.

Although there are a few associations of beekeepers in the region, most are small in membership and weak in organisation. Several have gone into a state of dormancy after only a short period of operation. When asked to identify the reasons for the low productivity and weak organisations, beekeepers point to the high costs of imported equipment and materials, the back stabbing competition on the small domestic markets and the unorganised nature of regional and extra-regional markets.

In addition to the problems occurring on the farm and during the postharvest and marketing process, there are additional problems which can only be resolved with the support of public sector organisations. There are presently few, if any, standards and controls on hive products in the region. Consequently, adulterated honey is often found on the grocery's shelves and bees and hive equipment and materials are imported without satisfactory monitoring of same.

The lack of adequate phytosanitary controls is of great concern to beekeepers since this presently disease free region of the world stands at risk of being contaminated with the African bee and a number of hive pests and diseases e.g. foulbrood, which can be transferred from the mainland or islands such as Jamaica and Trinidad at any time. Live bees can be transported as stowaways on cargo vessels and spores and bacteria, agents of brood diseases, can be transported in fresh honey, beeswax or on used equipment and materials.

The Eastern Caribbean, particularly the members of the Organisation of Eastern Caribbean States, is presently looking for new crops with socio-economic benefits as part of the on-going diversification effort.

A large number of national, regional and international support organisations are active in the region, each with special areas of expertise and some amount of resources available. Several of these organisations working in unison could provide much of the training, technical assistance and financial resources to create a viable beekeeping industry which would benefit hundreds of rural persons in the region.

Given the potential benefits of an efficient beekeeping sector to the ecology and economy of the region, this project should be given serious consideration for development.

2. Objectives and Expected Outputs

General

The general objective of this project is to provide the necessary support to beekeepers and organisations of beekeepers to permit this industry to become established and develop on a self-sustaining basis, thereby favourably impacting environment, job opportunities and rural welfare in the Eastern Caribbean.

Specific Objectives

1) To strengthen the organisational structure of beekeepers in participating countries.

2) To develop and transfer modern beekeeping techniques to participants.

3) To promote better management of the environment, including agro-forestry emphasising indigenous species and the organised expansion of bee pasture.

4) To promote adequate legislation and effective enforcement, for the development and protection of the beekeeping industry.

5) To /stimulate the establishment of rural businesses linked with the beekeeping industry.

Expected Outputs

1) An organisational structure suitable to the needs of beekeepers of the region.

2) Ready access of beekeepers to beekeeping equipment and materials in each island.

3) Linkages between beekeepers and agro-forestry and/or environmental programmes established in each participating island.

4) Market opportunities for diverse hive products identified, quantified and developed.

5) Common policies and legislation for supporting and protecting the beekeeping industry agreed upon and operational.

6) Cost/benefit analyses undertaken on the technical and economical viability of small-scale rural enterprises such as: production of small equipment and materials for the industry, candle making from bees wax, queen rearing, pollen for export, cosmetic products and others.

7) Improved production, productivity and quality of hive products as a result of beekeepers in each participating country using modern beekeeping practices.

3. Activities to be Executed

The achievement of the Project objectives will require organised activities in the following areas:

3.1 Planning for the strengthening of organisations

This activity will be initiated with a regional meeting of beekeepers from all participating countries. During this meeting the project objectives and activities will be reviewed and modified and a long range plan of action will be decided upon.

One of the first actions following the regional meeting will be the execution of a diagnostic study of the present situation of each existing beekeeper organisation in participating countries. The results of the diagnosis will provide the input for the design of specific actions to strengthen each individual organisation and to establish an effective regional coordinating

mechanism. Where organisations do not exist, a diagnosis will be made of the individual beekeepers and their needs.

Ideas will be converted into projects and viable ones will be assisted in identification of sources of funding and in project development.

3.2 Training

Diverse types of training will be required for the duration of the Project. These will include in-service training, seminars, workshops, short courses, use of the radio, TV and press. Short courses will include bee biology, bee behaviour, botany and pasture, equipment and materials, apiculture assets, management, marketing, product diversification, monitoring and control of imports and others.

The training will be conducted at the national level for the most part but in some instances regional events will be organised. Audiovisual training materials will be used as much as possible and attempts will be made to establish beekeeping information centres in each country.

3.3 Developing and acquiring audio-visual material

There is a lot of training material available on beekeeping, much of it applicable in the tropics. This material will be acquired and made available to the training programme and on a regional basis in general. As the Project develops, particular projects, case studies or technical aspects will be identified which justify the preparation of audio-visual material. Specialists will be contracted to prepare these materials and the results will be disseminated as part of the Project.

3.4 Integration of beekeeping into agro-forestry projects

There are a number of agro-forestry or environmental projects underway or in the planning stage which can be strengthened with the addition of a beekeeping component. Under this activity these projects will be identified and actions taken to establish linkages. Pan-American Development Foundation will make an effort to integrate beekeeping into all their forestry projects and close working relations will be established with the Environmental and Coastal Research (ENCORE) project, CANARI and others.

Inventories of most favourable bee pasture will be carried out in each island and nurseries of recommended species will be promoted and facilitated.

Attention will be given to the promotion of the concept of Integrated Pest Management to minimize the damage done to bee populations by chemical treatments. Efforts will be made to coordinate with banana associations so as to minimize damage to bee populations by spraying programmes.

3.5 Researching of market opportunities

At the present time there is almost no organised information on market opportunities for hive products which can be economically produced in the West Indies. Consultants will be employed to identify market opportunities. The market research will include demand characteristics, competition, packaging requirements, transport constraints, postharvest handling costs and prices. Based on the results of the market research, a regional marketing strategy will be formulated.

In addition, a supply mechanism will be developed to assure beekeepers of access to good quality beekeeping equipment and materials. Efforts will be made to establish a regional bulk purchasing network.

3.6 Strengthening of legislation and quarantine control

Most of the governments of the Eastern Caribbean are beginning to develop common legislation and quarantine controls for fresh fruit and vegetables. This activity will assure close liaison with the respective governmental units to promote the inclusion of bees and bee products and materials in the institutionalised systems. Research will be carried out to evaluate the dangers of Africanisation of bee populations in the Eastern Caribbean and proper methods of control and management. Training will be conducted where relevant.

3.7 Development of small-scale rural enterprise

Under this activity opportunities for the production of sub-products from beekeeping, or complementary to, will be identified and projects formulated and evaluated. Such projects will form part of on-going rural development projects in the respective countries.

Attempts will be made to identify projects which will lead to the reduction of imports of hive products or bee keeping materials as well as projects which produce high quality products which can be exported to regional and/or extra-regional markets.

4. Duration of Project

The process of building institutions is a long-term process. Beekeepers, like farmer organisations everywhere, require several years to reach self-sustaining capabilities. It is felt that this project can achieve many of its goals in a period of five years but should be considered over a 10 year time frame.

5. Costs

The costs for the development of the diverse components of this project will be determined by a special committee which will also recommend strategies for project implementation.

6. Participating Organisations and Institutions

The success of this project will require a comprehensive and integrated approach with a large number of participating organisations and institutions providing specific inputs. One possible strategy would be to integrate ongoing actions and to utilize resources from a number of donor and support organisations presently active in the Eastern Caribbean.

The following table identifies a number of organisations and institutions with activities in the Eastern Caribbean and indicates the types of assistance they may be able to provide to support efforts to strengthen the beekeeping industry.

Countries participating in this regional project may include all or most of the following: Antigua and Barbuda, Barbados, Dominica, Grenada, Montserrat, St. Kitts and Nevis, Saint Lucia, St. Vincent and the Grenadines, Trinidad and Tobago.

Possible Sources of Assistance for Regional Beekeeping Activities

SOURCE	Type of Assistance which may be Provided					
	Grants	Loans	Tech. assist.	Travel expenses	Information	Input Supply
International Organisations:						
- Food and Agriculture Organisation	x		x		x	
- Inter-American Institute for Coop on Ag.			x	x	x	
- Organisation of American States	x		x		x	
- International Bee Research Association			x		x	
Bilateral Sources:						
- Canada Fund	x					
- Canada Training Awards Project			x	x	x	
- Peace Corps	x		x		x	
- French Technical Mission	x		x	x	x	
- HIVOS	x	x	x		x	
- Voluntary Services Oversees	x		x		x	
- US Agency for International Development	x	x	x	x	x	
- Ministries of Agriculture			x	x	x	
Association/Foundations						
- Inter-American Foundation	x			x		
- National Development Foundations		x	x		x	
- Pan-American Development Foundations	x		x		x	
Regional Sources:						
- Agriculture Diversification Coor. Unit			x	x	x	
- Barclays Dev. Fund Caribbean	x	x				
- Caribbean Apicultural Dev. Association			x		x	
- Caribbean Conservation Association					x	
- Caribbean Farmers Development Company						x
- Caribbean Natural Resources Institute	x		x		x	
- Caribbean Ag. Research & Dev. Institute			x		x	
- Caribbean Trade Information Service					x	
- Caribbean Assoc. Industry & Commerce	x	x	x	x	x	
- Caribbean Development Bank	x	x	x		x	
- Caribbean Network for Integ. Rural Dev.			x	x	x	
- East. Carib. Org. of Dev. Foundations		x	x		x	
- Island Resources Foundation	x		x		x	
- Small Enterprise Assistance Project			x		x	
- Florida Assoc. Voluntary Agencies for Caribbean Action			x	x	x	
- University of Puerto Rico, Mayaguez			x		x	
- University of the West Indies			x		x	
- Windward Is. Banana Growers Assoc.			x			
Totals	15	7	27	10	28	1

SECTION 4

AGRO-FORESTRY AND EVIRONMENTAL PROTECTION IN THE EASTERN CARIBBEAN - ONGOING

PAN AMERICAN DEVELOPMENT FOUNDATION AGROFORESTRY PROJECT

By

Richard Ince
Regional Coordinator

In 1991 the Pan American Development Foundation (PADF) began implementation of a three year regional agroforestry project. The work is being carried out in Costa Rica, Dominican Republic, and three islands in the Eastern Caribbean, Antigua, Dominica and Saint Lucia. Funding, for a total of US$1.2 million is coming from a variety of sources. A matching grant from the U.S. Agency for International Development (USAID) contributes about 50% of project funds. The balance of the overall budget is being met from the private sector, and includes money from other foundations (PAX World), corporations (Citibank), and smaller amounts from individuals.

The Agroforestry Project is designed to have a dual purpose. First, through the introduction of multipurpose, commercial tree species, alternative and supplementary sources of income will be generated for small-scale farmers. Secondly, new plantings will reduce erosion, provide shade, and beautify the landscape. Additionally, as the project is being implemented through local collaborating organisations, the project will build expertise and create a resource base for continued work at the local level beyond the time frame of the project. In the Eastern Caribbean, the Environmental Awareness Group (Antigua), Dominica Conservation Association (Dominica) and Caribbean Natural Resources Institute (St Lucia), are PADF's partner organisations. These organisations are responsible for day-to-day project activities and for coordination with other local groups. An effort is being made by the local organisations to involve government ministries, particularly agriculture and forestry. This will ensure wide dissemination of agroforestry knowledge, and helps to tap local experts for project support.

There are three key objectives to be met under the agroforestry project. These objectives, to be undertaken concurrently, are (1) to establish new nursery production facilities on a community level, or supplement existing nurseries, in both cases insuring that an adequate volume of seedlings are in both cases insuring that an adequate volume of seedlings are available to meet local demand for trees; (2) to plant one or more agroforestry demonstration sites on each island, thereby helping to practices suitable for the geographic area; (3) to put in place an outreach programme to make contact with innovative farmers already applying agroforestry practices, and identify farmers and other people in the communities interested in tree planting. A seedling delivery system is also part of this third objective.

A fairly broad interpretation of agroforestry has been assumed for the project. While PADF recognizes the need for promoting tree planting in close

association with annual crops, and within grazing regimes, a more liberal and general approach to introducing useful trees on farms and within project communities has been applied. Not in all cases are trees being planted within the strict definition of agroforestry. Plantings qualify so long as the trees have obvious economic and social benefits to farmers and communities residents.

The most popular tree planting practice under the scope of the project is the addition of backyard fruit trees. This is probably the most widely accepted, and traditional agroforestry practice in the Caribbean. In spite of the seemingly disorganised array of individual tree species observed in many properties, backyard planting can significantly supplement the food available to the owners, and can become the source of small cash crop offerings in local markets. Citrus, mango, guava, and avocado pear, are some of the popular species being grown under the agroforestry project.

Interplanting, including the introduction of alley cropping is included as a useful practice for promotion by PADF and our local partner organisations. Many vegetable growing sites, particularly in semi-arid areas, can benefit from improved micro-climate conditions created by carefully spaced trees. The overstory trees reduce wind damage, cast partial shade, recycle nutrients from the sub-soil, and produce multiple crops on fixed units of land. This system can work well on drip-irrigated farms, making efficient use of limited water supplies. The potential benefit of nitrogen fixation from the air by leguminous trees, and incorporation of their green manure into vegetable crop alleys is being demonstrated on two of the project sites.

Many Caribbean farms can benefit from windbreaks, especially plots of bananas, and utilising multi-purpose trees on field edges can also yield supplementary crops. Living fences, that not only form a barrier to exclude cattle, but produce forage and building materials, are being used by farmers cooperating in the agroforestry project. Leucaena, gliricidia, casuarina, and other species are popular for windbreaks and fences. Mango has traditionally been used for banana windbreaks in the Windward Islands.

Trees are being grown under the project for timber and other building materials, fuelwood and charcoal, and for smaller size roundwood, such as poles and fence posts. One aspect of the PADF project will consider timber trees that can be grown in widely spaced patterns over banana crops. This will require trees which naturally form straight holes and prune branches naturally, or can be pruned by farmers to produce good timber. At the same time, the trees must develop only limited shade competition for the banana understory. Some new tree introductions, and research into selected native species will be carried out within the project.

Of special interest to beekeepers is the number of agroforestry tree species that are used by bees. The benefit of pollination of fruits and vegetables on farms demonstrates the interrelationship that exists between these insects and tree crop species. The agro-forestry project is making an effort to identify beekeepers, especially those interested in growing multi-purpose trees. Beekeepers have traditionally protected natural and planted vegetation to ensure adequate bee forage in local areas, and individual beekeepers have a role to play

in promoting future planting of trees. It is expected, that work under the PADF agroforestry project will result in a guide to trees and shrubs useful for beekeeping and other benefits, on farms and in communities in the Caribbean.

ENCORE PROJECT

Crispine d'Auvergne

ENCORE stands for the Environmental and Coastal Resources Management (Project). It is a project funded by the United States Agency for International Development (USAID) and administered by the Organisation of Eastern Caribbean States (OECS).

The main goal of ENCORE is to promote sustainable utilisation of natural resources within OECS territories. It originated as a result of the awareness of the need for these territories "to develop and implement appropriate policy, legislation and regulatory mechanisms; to provide awareness programmes to their people; and to carry out economically viable activities that foster environmentally sound and sustainable development". Recognising the interdependence between economic growth, environmental protection and community participation, ENCORE seeks to "demonstrate that the collaboration between public, private and community interests can conserve the natural resource base and enhance bio-diversity while promoting economic development".

The ENCORE Project is funded by a US$11 million grant from USAID and US $1 million from OECS Governments. It will have a duration of six years. ENCORE is comprised of two components: A regional component to be conducted in all OECS territories and a Local Site component to be implemented in Saint Lucia and Dominica.

REGIONAL COMPONENT

This is intended to strengthen the capabilities of member states to address environmental management issues. It will attempt to do so by providing assistance in the following areas:

1. Training: Funding (1) will be provided for long term and short term academic/technical training.

2. Public awareness and education: US$233,000 will be set aside for this purpose in order to heighten awareness among OECS populations of environmental issues. Special groups may be targeted, e.g. media, and students.

3. Policy Dialogue: (US$422,000): ENCORE will assist OECS territories in addressing environmental policy issues such as coastal zone/land use policy.

4. Environmental Monitoring (US$525,000): ENCORE in collaboration with such agencies as CEHI will assist the OECS territories in developing local capabilities for environmental monitoring, data collection and data analysis.

LOCAL SITE COMPONENT (LSM)

This component is intended to address specific environmental problems by implementing site specific activities. It will attempt to address these problems by encouraging community participation in identifying issues and proposing and implementing corrective measures. It will also endeavor to develop local site capabilities to deal with developmental and environmental issues in the longer term. In Saint Lucia the LSM will be implemented in the Western (Anse-la-Raye - Soufriere) region and in Dominica in the Cabrits and Scott's Head areas. In Saint Lucia US$2.9 million will be allocated with US$1 million to be used for actual site activities.

NATIONAL FORESTRY ACTION PLAN - SAINT LUCIA

By

Gabriel Charles

1. Introduction

The future of Saint Lucia's economy will largely depend on putting a stop to deforestation and other forms of environmental degradation. The forest resources must be put under proper conservation practices. Consequently, the Government of Saint Lucia has prepared a National Forestry Action Plan which covers a five year period and focuses on the five priority areas of FAO's Tropical Forestry Action Plan (TFAP) methodology, namely:

1. Forestry in Land use;
2. Conservation of Forest Ecosystems;
3. Fuelwood and Energy;
4. Forest-based Industries Development; and
5. Institutions.

The total cost of the five-year National Forestry Action Plan is estimated at over US$12 million. Implementation of this Plan will be mainly the responsibility of the Ministry of Agriculture through the Planning unit and the Forest and Lands Department (FLD).

2. Overview of the Forestry Subsector

The total forest area of Saint Lucia, approximately 8,000 ha (13% of the land area) constitutes one of the main environmental benefits to the island. These forests and other treed areas are slowly being eroded by encroachment and misuse.

Analysis of the status of Forestry in Land Use indicates inadequate land use planning and coordination of watershed protection. Insufficient soil and water conservation measures have led to stream pollution, soil erosion and reduction of water retention capacity in the watershed. Much of this is a result of cultivation on marginal lands, poor farming practices and lack of land use policy.

In the area of Conservation, Saint Lucia is attempting to bring under protection sensitive areas of biodiversity and to establish national parkland. There is, however, no set policy as yet to guide conservation of the forest ecosystems outside of the Forest Reserve. There is also insufficient institutional capacity for regulation. Public awareness needs to be strengthened regarding the benefits of environmental conservation and its impact on economic development, particularly in the public sector.

The Fuelwood and Energy priority area is a major contributor to wood use in Saint Lucia. Fuelwood and charcoal are used by approximately 83% of households. While this usage appears to be decreasing it still accounts for pressure on the existing forest and needs to be controlled and augmented by the establishment of community fast-growing fuelwood sources, particularly in areas where pressure on the forest is greatest.

Forest-based Industries are limited to woodcutters producing material for use by the local furniture and building industry. The sustainable capacity of the present resource is not sufficient to support medium-sized wood utilisation plants.

In the priority area Institutions there is conflicting legislation and areas where inadequate or no legislation exist, which needs to be remedied. Institutional assistance is also needed in land use planning and upgrading of institutional capacity in the lead institutions. This is most specific in the area of regulation of the natural and environmental resources.

The National Forestry Action Plan is designed to strengthen the subsector's contribution to Saint Lucia's economy based on improvements ranging from legal reform and improvement of regulatory capacity to institutional support in land use planning, improvements in forest management, afforestation and ecological protection.

3. National Forestry Action Plan

The Saint Lucia National Forestry Action Plan was prepared through the combined efforts of the Government of Saint Lucia, the Food and Agricultural Organisation of the United Nations (FAO), acting as the lead cooperating agency,

and the Overseas Development Authority of the United Kingdom (ODA/UK) which provided most of the funding.

During the preparation of the plan, policies and conditions in the forestry and related subsectors beginning at the community level were studied and analyzed for use as guides to the preparation. Based on priorities and objectives, strategies and programmes were formulated or presented leading to the presentation in the Action Plan of 23 project proposals.

Planning capability in land use and watershed protection as well as legal and regulatory frameworks need to be strengthened in order to support the continuation of the planning process and implementation of programmes along recommended lines.

4. National Development Policy Framework

While the National Development Plan is still in preparation, the following statements expressed in the objective of the National Physical Development Strategy (proposed 1990) are relevant to the protection, enhancement and development of the forestry subsector, and to its increased contribution to the nation's environmental well-being.

1) to conserve and protect all essential elements and process in the natural environment;

2) to conserve and protect all areas of outstanding natural beauty;

3) to limit the adverse effects of all forms of development on the environment to the minimum;

4) to improve the functioning of the urban environment through zoning, land use conformity and other measures;

5) to develop to the full potential agriculture, fishing and other rural industries.

The National Forestry Action Plan has been prepared and should be implemented within this broad policy framework as part of the Government's official development policy.

5. Plan Objectives

Study and analysis in the preparation of the National Forestry Action Plan indicated that substantial progress was being made in the areas of resource conservation and environmental preservation but that a number of constraints were present to impede progress to meet the economic and social needs. Removal of the constraints, and improvement of the institutional and legislative requirements will allow for a stronger participation in the management and development of the natural and environmental resources of Saint Lucia and provide for a more interactive role for the lead institutions with the rural population and offer

resource-related private and public agencies. This will also provide the required flexibility for the successful implementation of the Plan.

To implement the Plan the following objectives have been set:

Overall Subsector Objective:

To conserve and manage the natural resources for the protection of the environment and to obtain maximum utilisation consistent with sustainable development and with regard to the welfare of rural communities.

Priority Area Objectives:

Forestry in Land Use: To allocate appropriate land to secure a resource base for sustainable forestry and allied activities to ensure the protection of the environment, particularly watersheds, and to provide diversity for opportunities to generate income for the rural population.

Conservation of Forest Ecosystems: To conserve biological diversity and natural forest ecosystems through the establishment of protected areas, and to maximise their contribution to national development.

Fuelwood and Energy: To sustain fuelwood resources and alternative energy sources within the constraints attendant on the preservation of the environment.

Forest-based Industry Development: As far as possible develop the management of the limited forest resources for the maximum social and economic benefit.

Institutions: To bring policies and laws in line with national natural resource policies, develop an institutional framework capable of carrying out development requirements and to ensure maximum participation of the public and non-governmental organisations.

6. Development Programmes

Programmes are presented in each of the five priority areas within the framework of the objectives presented above. The programmes respond to problems identified in each of the priority areas and are composed of specific projects formulated as "project profiles".

In the field of Forestry in Land Use, four programmes make up a total of eight projects. The "Watershed Management Programme" addresses problems of deterioration in upper watershed areas with a view to remedial action and preparation of a plan for watershed improvement on a sustainable basis. The programme is composed of Projects 1.01 (Sustainable Development in Watersheds; 1.02 and 1.03 Fond St Jacques and Choiseul Watershed Management Projects).

The "Agroforestry Programme" is intended to address the need for diversification in marginal agricultural areas, particularly on steep slopes and in areas where pressure is being placed on the forest by landless farmers. There

are four projects included. These are Projects 1.04 (Agroforestry Development); 1.05 (Beausejour Communal Pasture); 1.06 (Honey Production), and 1.07 (Forest Improvement and Plantation Maintenance).

In the priority area "Intensive Forest Management", Project 1.07 (Forest Improvement and Plantation Maintenance) constitutes the single project in this programme. It plans to address natural forest improvement for future production and to bring management information and plantation maintenance up to date.

The "Land Use Programme" consists of Project 1.08 (Development of a Land Bank) which deals with the problem of acquisition, consolidation and redistribution of Crown lands and unused lands.

The priority area Conservation of Forest Ecosystems contains seven projects which aim at improving the ecological data base and protection and ecological conservation with a view to the economic feasibility of nature tourism. These projects are Project 2.01 (Coastal Resources Development; 2.02 (Proposal for National Parkland Development); 2.03 (Nature Trail Development); 2.04 (Herbarium Expansion and Development); 2.05 (Bois d'Orange Wetland Bird Sanctuary); 2.06 (Wetland and Waterfowl Conservation); and 2.07 (Wildlife and Fauna in Saint Lucia).

As there is a sufficient but declining demand for fuelwood/charcoal, only two projects have been developed under the priority area Fuelwood and Energy. Project 3.01 (Pilot Establishment of Community Woodlots) intends to relieve the pressure on forest resources and Project 3.02 (Biogas Plant Production) looks at an alternative natural source of energy for the small landholder.

The Forest-based Industrial Development priority area is restricted to only one project owing to the fact that the sustainable productive quantity of timber from the existing forests will only support limited local part-time industry. Project 4.01 (Cooperative Forest Industry) proposes the organising of woodcutters for sustainable annual production of sawn material from the forest under management.

Finally, the priority area of Institutions includes 5 projects under three programmes. The "Public Education Programme" is made up of Project 5.01 (Establishing/Strengthening Environmental Clubs in Schools), in natural resource education.

The "Institution Building Programme" is made up of the Projects: 5.02 (Land Use Planning Model); 5.03 (Conservation Expertise for SLBGA), and 5.04 (Strengthening of the Information Unit of the Ministry of Agriculture).

The "Legislation Programme", Project 5.05 (Natural Resource Legislation), is an "imperative" before the Land use and watershed projects can be initiated.

ENVIRONMENTAL AWARENESS GROUP AGRO-FORESTRY PROGRAMME

By

Roberta Williams

Presented by
Abudu Jaima

The Environmental Awareness Group (EAG) is a national non-profit organisation in Antigua committed to community-based action. Its priority areas of activity include: (1) Environmental education (2) Protection of coastal and marine resources, and (3) Promotion and development of agro-forestry.

The Agro-forestry committee of the EAG is responsible, the implementation of its agro-forestry programme. The programme, funded by the Pan American Development Foundation (PADF), has as its objectives, to:

1. Increase tree planting on farms for:

   - tree crops such as citrus, mangoes, etc;
   - bee products such as honey and wax;
   - environmental benefits, such as wind and fire breaks and to reduce soil erosion;

2. Increase number of woodlots to be used for charcoal, medicinal products, and possibly for commercial harvesting of lumber;

3. Increase use of trees in livestock systems, as sources of fence posts and fodder;

4. Increase the number of trees in urban and peri-urban areas, particularly on school grounds, in the Botanical Gardens, and along roadsides;

5. Improve the availability and quality of selected tree seedlings for general use by the public.

6. Reforest sections of selected watersheds, in particular proposed eco-tourist sites.

7. Maintain, and increase where possible, the diversity of tree species represented in Antigua and Barbuda by promoting rare and endangered species, especially endemics.

The programme will be implemented using several tools, which form components of the overall programme:

- Nursery support
- Demonstration sites
- Extension
- Workshops

In its drive to increase tree planting activities in the island, EAG is currently working on several fronts. We have been organising meetings with farmers to discuss ways in which trees can be utilised in their farm enterprises.

In addition, EAG is conducting a survey, with assistance from the Village Councils, to assess tree needs, and determine the types and quantities of trees desired. The survey will also provide an overview of the types and numbers of trees already established. Village groups, civic, sports and religious groups are being contacted to promote interest and concern about planting trees in urban and peri-urban settings such as parks, school grounds, church facilities and along roadsides.

One urban project which was launched on World Food Day of last year, involved the Antigua Defence Force, the Boys Brigade and other volunteers such as the PAX World Foundation from the USA. Over 75 palms and mahogany trees were planted and will enhance and beautify a large area of east St. John's city. In order to ensure that enough trees are available to the general public, another component of the agro-forestry programme provides support to commercial nurseries. A collaborative effort is underway between EAG and private nurseries to update nursery facilities in terms of infrastructure and improvement of plant materials. Todate, eight nurseries have been contracted to grow over 30 tree species of which eight are new introductions to the island.

EAG has assisted several nurseries to obtain materials for the construction of shade houses and installations of mist systems. Training is another vital activity of the agro-forestry programme. Efforts are being made to upgrade the technical skills of nursery owners and their staff. A series of workshops have been planned/executed in conjunction with IICA and PADF. The first workshop, "Budding and Grafting for Plant Propagators", was held on January, 29, 1992. Over 30 participants representing private nurseries, Ministry of Agriculture nursery and forestry staff, and landscape and grounds maintenance personnel from the hotel industry attended this very successful workshop.

EAG has also begun to establish demonstration sites, which will be used to illustrate various agroforestry practices.

- Alley-cropping observational plots using Gliricidia sp. and Leucaena sp as hedgerows;

- The establishment of a 3 acre citrus orchard fully irrigated, and;

- A most interesting intervention, the use of trees as a nectar source for beekeeping.

AGRO-FORESTRY AND ENVIRONMENTAL PROTECTION DEVELOPMENT PROJECTS IN DOMINICA

By

Eddy Le Blanc

The main concerns of the Dominica Conservation Association lie with the factors affecting the Environment, the need for safer and better practises in Agriculture, the elimination of harmful practices of chemical usage and soil erosion resulting from deforestation during monocropping agricultural practices in the banana industry.

We sound a crucial note of concern against the gradual destruction and deforesting of bee forage pastures (Nectar-producing plants) and the lack of a re-planting effort for bee/nectar producing plant species in Dominica.

We would like to encourage all planting and reforestation efforts to include nectar producing plants and for development projects on the island to give consideration to the improvement and protection of bee forage areas. We are also of the opinion that environmental impact studies should take bee pasture areas into consideration when such studies are being carried out.

There is a general lack of sound legislation that protects the Bee Industry and their environs as far as bee pasture areas are concerned. Some nectar producing plant-species in Dominica that must be given priority attention are listed below. Technical names need to be identified and efforts made to expand their production.

Borreria leavis	(Zeb Akwa)
Commelina diffusa	(Zeb gwa)
Cordia laevigata	(Coco poule)
Haematorylon campechianum	(Capesh)
Lantana camara	(red sage)
Leonurus sibiricus	(Chandelier) and (herbe savon)
Mangifera indica	(Mango)
Mimosa pudica	(Mese Marie) or (Honteuse Femelle)
Mormordica charantia	(pommp Colle) or (Cocoulie)
Myrcia splendens	(Bois Petite Feuille)
Petiveria alliacea	(kudjuruk)
Sida acuta	(Broom Weed)
Stachytarpheta jamaicensis	(Verveine la queue rat)

Source: Caribbean Wild Plants and Le Blanc Herbal Research

In light of the above and other significant factors the Dominica Conservation Association is, in collaboration with the Pan American Development Foundation, the Ministry of Agriculture and Forestry Department, the Carib Council of Dominica (where the project is undertaken in the Carib territory), and Plenty Canada, undertaking an Agro-forestry development project that includes a nursery and Community Education.

The Agro-forestry project is expected to provide the following benefits:

1. The establishment of a model for an agro-forestry demonstration plot (integrated system that utilises the full potential of mixed farming and intercropping.

2. Provide the opportunity for increased production of ground provisions, fruit, vegetables, livestock and beehive products in selected areas.

3. Incorporate the collaborative skills of nursery operators and improve production capabilities.

4. Training for vegetable farmers, charcoal producers, beekeepers and agro-technical personnel.

5. Provide benefits such as improved soil conditions and more productive livestock and apiculture to farmers.

6. Facilitate cross pollination where apiaries are centered on agro-forestry farms.

7. Increased supply of nectar for bee colonies from new plantings.

Advantages of Agro-Forestry

Agro-forestry helps restore soil fertility and rid the land of noxious weeds, pests and diseases. It gives restorative power to the top soil and encourages the growth of deep rooted trees and shrubs that recycle plant nutrients and build up soil organic matter.

Plant cover and litter protect the soil from the impact of high intensity raindrops and the roots help to bind the soil, increase water infiltration and reduce runoff and soil erosion. Moreover, litter mulch and shading by trees and shrub canopies reduce soil temperature and help to maintain soil moisture that is favourable for the growth of beneficial soil macro- and micro-organisms. This shading significantly reduces weed infestation.

In addition to helping to restore soil fertility, the agroforestry farming system provides supplementary food, animal feed, stacking material, firewood and herbal medicine. It also provides trees for furniture, construction, boat making and handicrafts.

Since farmers in many developing countries in the tropics cannot afford costly inputs, it is necessary to develop a low input soil management technology that can sustain crop production. Agroforestry techniques are useful in this sense.

Livestock reared on the agroforestry farm produce manure for vegetable production and excess dung, when decayed, helps to return vitally needed nutrients to the soil.

ACTIVITIES OF THE CARIBBEAN NATURAL RESOURCES INSTITUTE IN SAINT LUCIA

By

Mathias Burt

The Caribbean Natural Resources Institute (CANARI) is a regional non-governmental organisation with principal offices in Saint Lucia and in the Virgin Islands. Its mission is to strengthen peoples' capacity to manage resources which are critical to development. This is done through research experimentation, demonstration projects, and education and training. The Institute advocates the involvement of people and promotes systems of collaborative management of the natural resources which impact directly on the lives of human communities.

CANARI is not directly involved in apiculture, but contributes indirectly through its Community Forestry programmes. In Saint Lucia, these community forestry initiatives are undertaken in collaboration with the Forest and Lands Department. Communities, groups, individuals and schools are encouraged to plant trees for the purposes they see fit. Some of the communities which are presently involved in the process are the Darban Community Forestry Group, the Pierrot Youth Organisation, the Mon Repos Mothers and Fathers Group, the Desruisseaux Farmers Cooperative and the Aupicon Charcoal and Agricultural Producers Group. In some of these groups farmers have requested trees which are nectar producers so as to widen the now limited supply of such trees. Most of these groups are encouraged and supported to establish nurseries, woodlots and planting on the holdings of their members. These activities are supported by the Pan-American Development Foundation and the Inter-American Foundation.

At present the Institute is involved in the propagation and planting trials of other tree species which are more adaptive to certain climatic conditions and with varied uses. Some of these species include Acacia mangium, Tamarind (Tamarindus indica), Logwood (Haematoxylum campechianum), and Albizia lebbek. These trees are supposed to be nectar producing and will be promoted for beekeeping when the trials have proved successful. Generally, efforts are being made to encourage the use of local species in forestry. CANARI is assisting the Plain View Combined School in the establishment of an arboretum which will have local species of medicinal and cultural importance adaptive to the conditions of that area.

It is critical therefore to understand the need to protect the existing wooded areas in the region as they support ecological, economic and other activities which are beneficial to mankind,

ANNEX

FIRST REGIONAL TRAINING WORKSHOP FOR BEEKEEPERS

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