



Food and Agriculture
Organization of the
United Nations

FAO Conference on Fusarium TR4

World Banana Forum (WBF)

Emergency project on Fusarium TR4 in Latin America and the Caribbean
International Plant Protection Convention (IPPC)

Capacity Building and Awareness Raising in Response to the Threat of Fusarium Wilt of Banana,
Tropical Race 4

Day 1 - "Current Context, Impact and Risk Communication"

Tuesday, July 27, 2021

Moderator: Ms Esther Peralta, Specialist in Agricultural Health of the Subregional Office for Mesoamerica of the Food and Agriculture Organization of the United Nations (FAO / SLM)

Opening Remarks:

Raixa Llauger, Agriculture Officer (Tropical Fruits), Food and Agriculture Organization of the United Nations

Victor Prada, Secretary General of the World Banana Forum (WBF)

Sarah Brunel, Deputy Director for Facilitation of Implementation at the Secretariat of the International Plant Protection Convention (IPPC)

Panelists:

Dr. Miguel A. Dita (The Alliance of Bioversity International and CIAT)

M.Sc. José Feliciano Galván Tovar (National Service of Health, Safety and Food Quality of Mexico - SENASICA)

M.Sc. Natividad Moreno Honorato (National Service of Agrifood Health, Safety and Quality of Mexico - SENASICA)

Mariela Segura (FAO Colombia - FAOCO)

Víctor Prada (World Banana Forum - WBF)

Raixa Llauger (FAO)

Xabier Garay (FAO Panama - FAOSLM)

Sarah Brunel and Camilo Beltrán (International Plant Protection Convention - CIPF)

Ingrid Sanabria (FAO Panama - FAO SLM)

The recording of the event is available on the website: <https://www.fao.org/tr4gn/news/news-detail/en/c/1415383/> and the starting time of each session is indicated in blue.

Summary:

Various FAO divisions collaborated to organize a series of webinars focused on capacity development and awareness raising on various topics related to Fusarium wilt of Musaceae, Tropical Race 4 (TR4). The webinar series aimed technical teams from national and regional plant protection organizations (NPPO and RPPO), private sector companies, corporations and associations of banana producers and exporters from Latin America and the Caribbean and other geographical areas. Academics and scientists from different universities and regional and international research centers linked to banana production also participated. The conference focused on providing an overview of the context and impact of the disease in Latin America, including updates on biosecurity measures, surveillance and TR4 management, covering the possibilities of using mobile applications and remote sensing technologies, advances in biological control, obtaining promising clones and procedures for the introduction of Musaceae plant materials safely. The first session focused on the current context of the disease in Latin America and the Caribbean, highlighting challenges, economic impact, and opportunities for collaboration.

03:28 Welcome Remarks and Explanation of the FAO Conference

Plenary

10:03 Fusarium wilt of Musaceae, Tropical Race 4. Latin American and Caribbean context, challenges and opportunities

Dr Miguel Dita thanked FAO and the WBF for inviting him to speak on what he called a timely initiative. He explained that his task was to present and describe the situation in the region in order to lay the foundations and bring context to future presentations by the panelists of the Conference.


He explained to the audience that Fusarium wilt, Tropical Race 4 is a soil fungus that affects the vascular system of banana and leads to its subsequent death. He presented to the audience the external and internal symptoms of an affected plant and gave an overview of the disease in the Latin America and Caribbean region, mentioning that races 1 and 2 of Fusarium wilt have been present for more than a century, however Tropical Race 4 was only identified in the region in the year 2019.

He warned that it is necessary to keep the focus on the possibility that areas infested with TR4 have not been detected and declared official. In this case, they are not under official control, so the countries considered free zones must always maintain a high level of surveillance and biosafety protocols.

TR4's recent incursion in the region raises questions and concerns, such as:

- How did TR4 get to the Americas?
- Was it detected in time?
- What needs to be done to face the disease?

The scientist stressed that the causative agent of the disease is located in the soil and that the symptoms take time to manifest. There is a relatively long incubation period, and the disease is usually present and



spreads in asymptomatic planting materials. Symptoms usually appear within six to nine months after infection. During this time, the infected plant is producing inoculum and producers can coexist with the disease without realizing it. In addition, as indicated above, due to its behavior in the soil, several factors can contribute to its spread, such as the use of dirty agricultural machinery, movements of workers and animals, runoff, etc. Dr Dita mentioned that, as observed in previous infections caused by Race 1 - a crucial factor for the spread of the disease is the planting material. According to the scientist, this continues to have a great impact on the spread of TR4 and other pests of commercial interest. The planting materials used in the region do not always have high quality and control standards. Consideration of various factors are extremely important when using tissue culture plants. The substrate used, the acclimatization process and the water used in irrigation can contain inoculum and infect the plants during the acclimatization process and transplantation to the field.

According to Dr Dita, key aspects of the epidemiology of the fungus that must be observed are that:


1. The fungus produces resistant chlamydospores that can survive in soil for long periods.
2. The fungus can survive in weeds without symptoms.
3. The fungus can easily spread through water and soil.
4. The fungus can spread in asymptomatic planting material.
5. The fungus has a relatively long latency or incubation period.
6. Symptoms of Races 1 and 2 are similar to Tropical Race 4.

These aspects are very important to take into account when conducting surveys and detections at the continental, regional and national levels. There must be constant monitoring in the field to ensure a clear understanding of the diseases occurrence. There is a clear example in Brazil and Laos, where Race 1 is present (Brazil) and Tropical Race 4 is present (Laos) and the symptoms in both cases are identical.

Dr Dita presented the banana production belt in the Americas, emphasizing the predominance of varieties susceptible to TR4. He noted the presence of an intensive informal exchange of non-certified planting material among producers and mentioned the importance of hurricanes in the Caribbean region for the spread of a myriad of pests and diseases. He highlighted the role of the National Plant Protection Organizations (NPPO) as the institutions in charge of monitoring important pests and diseases and the pressure on the institutions due to various demands.

With this in mind, the scientist recommended:

- Monitoring should be inclusive and collaborative between the public sector (NPPO) and the private sector (producers)
- The correct recognition of the symptoms in the field is of utmost importance considering the existence of the pathosystems. There must be constant development of the capacities of producers and field workers.
- The protocols and methodologies could be standardized through a regional surveillance platform, this could be coordinated from the NPPO and the IPPC.



Dr Dita highlighted that the official confirmation of the presence of pests or diseases is always the responsibility of the NPPO. The confirmation of a quarantine disease in a country can have consequences of social, political and economic importance, so that such a declaration must be reliable and verifiable. There are well-established protocols from sample collection in the field to molecular diagnostics in the laboratory. These protocols must be strictly followed to ensure accurate results.

Dr Dita mentioned that the situation in Peru is quite different from the one in Colombia. In Colombia, the disease is present with restricted distribution. This is due to the enormous effort and investments made in capacity development, biosecurity, surveillance and research. These successes are the result of the strong collaboration between public and private entities.

In Peru, since the incursion of the TR4, much has been done at the NPPO level. The infected area is located in a region of small family farmers, who practice flood irrigation, which is of great concern due to spreading irrigation. Another aspect of the uniqueness of the Peruvian incursion is the proximity of the affected area to the Ecuadorian border.


These differences between incursions highlights the need to evaluate the particularities of each country when defining a contingency plan. Each country has its own history of incursions, laws, procedures, production dynamics, etc., so the design of containment and management plans will vary according to the context. However, coordination, collaboration and action must always be based on science.

11:34 Prospective study of the potential Economic Impact of Foc TR4 in Mexico

Mr José Feliciano Galván Tovar and **Ms Natividad Moreno Honorato** presented the methodology and results of a study carried out by SENASICA focused on evaluate the potential impact of TR4 incursion on the Mexican banana industry. Mr Galván provided an explanation about the importance of the industry for the country, highlighting that Mexico is the 12th world producer of bananas and is responsible for 2% of the world exports of the fruit. In Mexico, the banana industry employs more than 300,000 people. The states with the largest production area in Mexico are Chiapas, Veracruz and Tabasco, which represent 63.5% of the national production.

Given the importance of the crop, SENASICA has developed a model to calculate the potential impact that the TR4 would have in the country in the event of an incursion. Ms Moreno clarified that, during the development of the model, SENASICA has considered three antecedents:

- The income generated by the crop represents 75% of the income of those who participate directly in its production.
- In the event of an incursion, the pathogen will render the affected area unproductive for a long period of time.
- The model must consider a scenario favorable to the stimulation of banana production with or without the presence of the pathogen.



The model was designed through an adaptation of a 2019 - FAO publication that suggested the loss of productive area due to the incursion of TR4 ([Banana Fusarium Wilt Tropical Race 4: A mounting threat to global banana markets?](#)). Based on the information extracted from this article, it was possible to establish parameters for the model. The model seeks to elucidate the impact of TR4 on the country's banana production considering a period of more than 20 years (until 2044).

The model was developed considering three possible scenarios with different propagation rates (1.25%, 25% and 50%). The spread rates were based on values described in the incursions in Colombia (1.25%) and in the Asian continent (25% and 50%).

The model considered that the disease spreads constantly in free-areas and indicated losses of approximately 4 425 ha (for the spread rate of 1.25%), 55 516 ha (for the spread rate of 25%) and 71 521 ha (considering the propagation index of 50%).

The economic impact is outlined considering the area (suitable for bananas) derived from the result of the surface free-of-pathogen minus the surface with the different propagation rates. This decrease in the area suitable for banana production will influence the number of jobs, the quantity and value of exports, the income of foreign exchange and the per capita consumption of the fruit in the country.


As a result of the projection for the year 2044, the following results were obtained: in areas free of the disease, there would be a 6% increase in the area sown and harvested. However, if the disease spread in the country at a rate of 1.25%, there would be a loss of 17% of the area, considering the rate of 25% a loss of 78% of the area and considering the rate of 50% a loss 97% of the planted area. In the most extreme case (considering a spread rate of 50%) the economic prejudice would be between approximately \$ 3,000 - \$ 5,000 million pesos.

The main conclusions of the study were:

- The arrival of Foc TR4 in Mexico would cause a huge economic impact on banana production, affecting all actors in the value chain, consumption levels and exports, threatening food security and the economic well-being of producers.
- Keeping Mexico as free-zone of the disease would prevent losses of 20 million tons of bananas, with an estimated value of 84 billion pesos over a period of 25 years.
- The consequences are aggravated according to the internal propagation rate considered, estimating a 50% propagation rate, the banana area losses reach 97% in 25 years.

1:07:29 Damage and Loss Assessment System for Multiple Threats in Colombia

Ms Mariela Segura Abril presented the systems being developed to assess damages and losses in a multi-hazard scenario in Colombia. The work presented the results of the project "Innovation and risk management in the face of multiple threats in Colombian rural areas". The project, which is jointly financed by the European Union and national funds from the Colombian government, identified eight situations where the evaluation of damages and losses in Colombian agriculture is necessary.



Agriculture is affected by various types of catastrophic events such as droughts, floods, hurricanes, earthquakes, plant pests and transboundary animal diseases. These events can cause impacts at different levels and dimensions such: humanitarian crisis, food insecurity, soil and water contamination, displacement of production sites, increase in the cost of agricultural production and food shortages.

The evaluation of damages and losses in the agricultural sector is an important tool to qualify and quantify these threats in order to support planning and the use of resources for their prevention and containment.

Ms Segura Abril defined damages and losses as:

- **Damage:** is the cost of replacement/repair of the physical assets and stocks that are totally or partially destroyed in the area affected by the disaster.
- **Loss:** refers to changes in economic flows due to a disaster (that is, production losses in crops, livestock, fisheries, aquaculture and forestry).

Over the years FAO has developed a [methodology to assess damages and losses in agriculture](#). This methodology seeks to measure the impact of various emergencies in the agricultural sector. FAO has also recently developed a [training course focused on the development of capacities to calculate damages and losses in agriculture](#).


In summary, the model developed requires accurate data from the pre and post-disaster scenario in order to provide a true picture of what was delivered. Therefore, FAO has used an IT tool with information from the Agricultural Productive Units (APU) to capture data at field level. The system also used the [Agriculture Stress Index System \(ASIS\)](#) developed by FAO. The correct use of these tools in the local context provides a clearer picture of the damages and losses in the face of a disaster affecting agricultural systems. Some of the parameters captured during this type of evaluation are:

- The relationship between estimated/actual production.
- The costs of pest and disease management.
- The cost of recovery of production systems.
- The increase in the sale price of the products.
- The Increase in the costs of agricultural inputs.
- Measurement of the affected areas.
- Damages and total losses.

1:36:40 [The TR4 Global Network as a neutral platform for information exchange and collaboration on TR4](#)

Mr Victor Prada briefly presented the history of the World Banana Forum, its mandate, areas of work, and the role of the forum as a neutral platform to discuss sustainability issues in the global banana value chain.

According to the Secretary General, The [TR4 Global Network](#) initiated by the forum is FAO's response to the threat posed by the disease to the global banana industry. The TR4 Global Network urges cooperation



between all FAO divisions working in TR4 and all links in the production chain, including academia and research centers, wholesalers, trades, retailers, NPPOs, governments, civil society, certifiers, importers, exporters, etc.

The Network also serves as a platform for collaboration and exchange of relevant and updated information on all aspects related to the disease. The Task Force on TR4 of the World Banana Forum (WBF), made up of a group of experts from different countries and sectors (governments, private sector, civil society organizations and research institutions), supports the Global Network contributing in the elaboration of materials. The user base encompasses everyone interested in banana and plantain production and its sustainability around the world.

1:58:14 The joint proposal of FAO, CAN, Bioversity Internacional / CIAT and IICA for the Andean countries.

Ms Raixa Llauger presented the actions that have been taken since TR4's incursion in the Latin American and Caribbean region, first in Colombia in 2019 and more recently in Peru in 2021. Based on the needs expressed by the countries of the Andean Community (CAN), FAO began to draft a project proposal in collaboration with the World Banana Forum, CAN, CIPF, IICA, the Alliance of Bioversity International and CIAT and the Ministries of Agriculture of the countries involved.

In preparation for the formulation of the project, a series of dialogues with CAN member states, the public sector and the private sector have been scheduled to discuss issues related to the TR4 and the national context.

- Dialogues between the public and private sectors took place on June 15, 2021 in Peru
- Dialogues between the public and private sectors took place on July 12, 2021 in Bolivia
- Dialogues between the public and private sectors took place on July 26, 2021 in Colombia

- Public and private sector dialogues will take place on August 11, 2021 in Ecuador

Based on the discussion already carried out, the preliminary areas identified within the proposal are:

1. Increased regional investments in infrastructure such as reference laboratories / regional services, external / internal quarantine, biosecurity, and introduction of pathogen-free plant material.
2. Strengthening of risk management capacities in Musaceae production sites and across country borders.
3. Include specific attention to the most vulnerable productive actors, including micro and small producers.
4. Promoting trust between the public and private sectors

The proposal is being developed through strong alliances between CAN, FAO, FMB, CIPF, Bioversity International, National Governments (NPPO) and IICA.

Risk reduction and communication

2:40:45 General aspects of risk reduction and management in FAO - methodologies applicable to phytosanitary threats

Mr Xabier Garay began his intervention by explaining that bananas are not his area of expertise, however, he is familiar with the threats, vulnerabilities and disasters in the agricultural sector. The notion that a phytosanitary emergency could have debilitating impacts on the political, economic and social aspects of an area or country provides evidence that it can be classified as a disaster. FAO has developed a [Methodology for Disaster Risk Management in the Agricultural Sector and Food and Nutrition Security in Latin America and the Caribbean \(2018 - 2030\)](#). Mr Garay considers that the parameters described in this document may be useful in the event of a possible phytosanitary disaster such as the incursion of the TR4 in a banana exporting country.

Mr Garay described the factors that constitute a hazard, aspects of vulnerability and what a disaster is and presented the necessary components to carry out a hazard analysis. In the threat analysis, it is required to access the history of the threat, the frequency of its appearance, the speed at which it moves, its location and its severity. A vulnerability assessment should also be carried out so that later, a disaster risk mitigation or management plan can be implemented.

According to the expert, a properly developed risk and disaster management plan will mitigate the impact of threats on the most vulnerable people, safeguarding livelihoods and improve the effectiveness of the post-disaster response, allowing people to maintain their dignity during and after the disaster.


3:03:12 Risk communication - Key elements considered by the IPPC

Ms Sarah Brunel and Mr Camilo Beltrán provided a brief overview of the IPPC and its mandate, emphasizing the role of the convention in developing international standards for plant health recognized by the World Trade Organization. Typically, the IPPC works on issues related to quarantine pests in a general way, but has recently started working on individual pests, such as *Spodoptera frugiperda*.

The IPPC implementation and capacity building (CI) committee is in the process of finalizing a CI team on TR4, [similar to that developed for *Spodoptera frugiperda*](#). The committee will be made up of nine (9) TR4 experts from around the world with the aim of:

- Develop a project plan (including webinars, trainings, resource mobilization, etc.)
- Add and review existing training materials and guidelines.
- Develop global prevention, preparedness and response materials relevant to implementation and capacity building, as well as materials focused on risk communication.
- Establish and maintain links with other relevant areas within FAO, with members of the IPPC, RPPOs and international trade organizations.

Ms Brunel highlighted that stakeholders can submit their ideas for additional activities to be developed by the IPPC team on TR4.



There is a need to collect and update existing resources on TR4 to make them available to stakeholders, as well as to improve the work of the IPPC team on TR4. For this reason, the IPPC will make a call of materials on TR4 that include: diagnostic methods, surveillance, containment measures, actions and response to emergencies, implementation of biosafety plans, contingency plans, simulation exercises and communication of risks. There was also a call for NPPOs and RPPOs to share national and regional materials.

Ms Brunel highlighted that risk communication is a very important process for engaging stakeholders. According to the FAO official, the parties must understand the reasons and motives for the actions. It is crucial that they understand the purpose of the pest risk analysis and of a specific phytosanitary measure, once they understand and see the benefits, the implementation works more smoothly and effectively.

Mr Camilo Beltrán presented the [IPPC pest risk communication guide](#) and its five principles: cooperation, transparency, respect, responsiveness and commitment. The official ended by providing examples of implementation in Ecuador, Costa Rica and Colombia.

3:22:00 Communication during a phytosanitary emergency

Ms Ingrid Sanabria started her intervention by mentioning that communication is essential during a phytosanitary emergency. According to the communication specialist, it is extremely important that all stakeholders and the public communicate properly leading to successful collective actions. To ensure that the message is conveyed correctly, there must be teamwork between subject matter experts, authorities and communication specialists. She explained that her role during the emergency in Latin America was to provide guidance on adequate and impactful communication.

The specialist stated that communication should take place during the different stages of a phytosanitary emergency - before (towards prevention), during (towards management and containment) and after (after eradication).

According to Ms Sanabria, despite the existence of various communication platforms, the mass media is key in the dissemination of information, so training and sensitizing journalists is extremely important for the existence of an awareness campaign in the face of a phytosanitary threat.

3:44:15 **Closing remarks.**

To discover the benefits of becoming a member of the World Banana Forum and to take an active role towards a sustainable banana sector, please visit:

www.fao.org/world-banana-forum

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TR4 Global Network

<http://www.fao.org/TR4GN>