

Papaya (*Carica papaya* L.) is an edible melon-like fruit that is planted throughout the tropical and sub-tropical world. Its juicy flesh is either golden-yellow or red when ripe and is perfect for salads, pies, and confections. The unripe fruit can be crushed or cooked like squash, and is a common ingredient in many Asian foods. Papain and other extracts from papaya are used by the food processing, pharmaceutical, and cosmetic industries. For example in the Philippines, it has become a popular ingredient in soaps, shampoos, lotions and other cosmetic products.



WHY IS PAPAYA IMPORTANT?

- Papaya is a rich source of vitamins as well as minerals and fiber.
- Papaya is the source of the enzyme papain, which is used in making beer, tenderizing meat, and in producing certain pharmaceutical and cosmetic products.
- Papaya is the 6th most important fruit crop in the Philippines and is planted mostly by small farmers.
- The Philippines exports papaya to countries in Asia, Australia, Middle East, and the United States.

WHAT HAMPERS PAPAYA PRODUCTION IN THE PHILIPPINES?

One important problem is the papaya ringspot virus (PRSV) disease. In 1982, a PRSV disease outbreak in Silang, Cavite severely affected the papaya industry in Southern Tagalog. The virus, which is transmitted by several

species of aphids, spreads fast among plants.



WHAT ARE THE SYMPTOMS OF PRSV DISEASE IN PAPAYA?

Infected plants have stunted growth, and produce deformed fruits with concentric rings on the skin surface. Eventually, the plants die. When plants are infected at the seedling stage or within two months after planting, their fruits often will not reach maturity. If trees are infected at a later stage, less fruit is produced. Fruits from infected plants will also be of poor quality due to ringspots on the fruit's surface.



HOW DO FARMERS CONTROL AND MANAGE THE PRSV DISEASE?



Once infected with PRSV, the plants cannot be cured. Farmers can use different ways to control the spread of the disease.

- Isolate papaya plants suspected of virus and delay their planting in the field
- Burn all infected papaya plants and destroy remaining ones within the surrounding area once symptoms of virus infection appears
- Plant other crops or trees that will help control the movement of aphid insects
- Avoid planting cucurbits, such as squash and melon, which can host PRSV
- Change cropping pattern by crop rotation or intercropping

HOW CAN BIOTECHNOLOGY OFFER A BETTER ALTERNATIVE TO TRADITIONAL CONTROL METHODS?

Traditional control methods used by farmers have limitations. In addition, natural resistance to the disease does not exist in any cultivated papaya. By using biotechnology, a variety can be developed with resistance to PRSV.

WHAT IS PRSV-R PAPAYA?

The PRSV-R papaya is a virus resistant papaya developed with the help of biotechnology. Its resistance to the PRSV disease is due to the introduction of a genetic material from the ring spot virus. This genetic material protects the papaya similar to immunization in humans. By planting PRSV-R papaya, farmers can obtain higher yield and better quality fruits.

WHAT INSTITUTIONS ARE WORKING ON THE DEVELOPMENT OF PRSV-R PAPAYA, AND WHO PROVIDES FUNDING FOR THIS PROJECT?

The Institute of Plant Breeding at the University of the Philippines Los Baños (UPLB) is developing PRSV-R papaya varieties. The biotech papaya project started in 1999 with major funding from the Department of Science and Technology (DOST) and the Philippine Council for Agriculture, Forestry, and Natural Resources Research and Development (PCARRD). Funding for the project is also provided by various international agencies such as the United States Agency for International Development (USAID) through the Agricultural Biotechnology Support Project II and EMERGE. The International Service for the Acquisition of Agri-biotech Applications (ISAAA), through its Papaya Biotechnology Network, facilitated the transfer of technologies from Monsanto Company to PCARRD.



Is PRSV-R PAPAYA SAFE?



Yes, before PRSV-R papaya reaches the market it must pass many tests and safety assessments. In the Philippines, biosafety is evaluated in four stages:

(1) contained research in laboratories and screenhouses, (2) small confined trials, (3) multi-locational field trials and (4) commercial release. The National Committee on Biosafety of the Philippines (NCBP) is responsible for evaluating the safety of PRSV-R papaya under contained and confined conditions. The Bureau of Plant Industry (BPI) under the Department of Agriculture is responsible for safety assessment and monitoring during large field trials and prior to commercial release.

Is PRSV-R PAPAYA ALREADY AVAILABLE IN THE MARKET?

PRSV-R papaya is already available in markets in the United States and Canada. Farmers in China have just started commercializing the crop. It is not yet available in the Philippines as it is still undergoing a series of evaluation for virus disease resistance.



For more information, contact:

Dr. Desiree M. Hautea
ABSP II Regional Coordinator and Product Manager
Email: dmh.uplb@gmail.com

or Dr. Pablito M. Magdalita
Project Leader
Email: pablitomagdalita@yahoo.com

Institute of Plant Breeding
University of the Philippines Los Baños
College, Laguna 4031
Telefax: 049-536-5140

This pamphlet is made possible by the generous support of the American people through the United States Agency for International Development (USAID). The contents are the responsibility of ABSP II and do not necessarily reflect the views of USAID or the United States Government.



September 24, 2007

Questions & Answers on the Development of

RINGSPOT VIRUS RESISTANT PAPAYA

in the Philippines



PROJECT PARTNERS:



ABII SP

MONSANTO
imagine

