Introduction

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Bananas (*Musa paradisca*) are cultivated on five continents in about 120 countries, and provide a staple food for millions of people.

Musa paradisca belonging to the family *Musaceae* is one of the most important staple crops in tropical and subtropical countries providing a good source of carbohydrates, minerals and vitamins. Their trade also creates a considerable income as a cash crop. Banana and plantains, are staple food crops for millions of people in developing countries. Banana and plantains are rich in carbohydrates and also high in some minerals, notably phosphorus, needed for bone development, calcium, and potassium. They are particularly rich in vitamins such as vitamin A (**Johanson & Ives, 2000**).

Banana is one of the most important fruit in Egypt and cultivated in wide areas. In 1996, banana production exceeded to 512.5 thousand metric tons and the average crop was 11.27 & 13.71-tons/ feddan (Ministry of Agriculture. ARE. 1996) as a result of cultivation of new varieties high in production.

Banana and plantains are propagated asexually by suckers since almost all of their cultivars are seedless or seed sterile. Banana agriculture is subjected to many natural diseases constitute a major problem. Virus diseases are serious, as insect vectors are abundant and there are many alternate hosts.

The viral diseases threatening banana production with a ratio of about 20-30% and occasionally reaching 50-80%. Banana plantations subjected to be infected with 7 viruses: *banana bunchy top nanovirus* (BBTV, **Dale, 1987**), *banana mosaic cucumovirus* (BMV, **Mali and Rajegore, 1980**), *abaca bunchy top virus* (AbTV, **Lockhart *et al.*, 2000**), *abaca mosaic potyvirus* (AMV), *banana streak badnavirus* (BSV), *banana bract mosaic potyvirus* (BBMV, **Stover and Simmonds, 1987**) and *banana die-back virus* (**Hughes *et al.*, 1998**).

Banana bunchy top disease was first recognized in Fiji in 1889, at a time when a serious epidemic threatened the island's banana export industry. Subsequent records are from Taiwan in 1890, Egypt in 1901 and Australia in 1913, international spread of BBTV is primarily through infected planting materials (**Wardlaw, 1961**).

In Egypt, the most important and serious diseases are those caused by banana bunchy top virus (BBTV) and banana mosaic virus (BMV). The two viruses, (specially the first one) are considerable as one of the limiting factors in the production of banana crop. The virus causes serious losses in many countries they are usually spread from plant to plant in nature by insect vectors, but often are also transmitted over long distances and from one crop cycle to another in vegetative planting material.

BBTV is one of 4 species in the genus *Nanovirus*; a single-stranded DNA virus with isometric virions 18: 20 nm in diameter. It infects most banana cultivars, retards the growth of infected plants and causes substantial economic losses to banana production. People transporting planting materials obtained from infected plants spread BBTV from plant to plant by aphids and from place to place.

Banana production is threatened by different biotic agents such as bacteria, fungi or viruses, such as the cucumber mosaic virus (CMV), which consists of a spherical particle of 28-30 nm in diameter containing ssRNA, is naturally transmitted by aphid vectors or by seed.

In Africa CMV follows after BSV in importance ranging from very low incidence in Ghana. In recent times CMV has caused severe epidemics in many crops, including mosaic and heart rot of banana worldwide (**Singh *et al.*, 1995**). Banana bunchy top disease is widely distributed among banana growing countries viz. Australia, Fiji, Egypt, Sirilanka, Bunion, Island, Pakistan and India (**Jiskani, 2004**).

Three viruses are known to infect *Musa* cultivars in Egypt. These are one isolate of cucumber mosaic virus (CMV) is banana mosaic virus (BMV) cucumovirus (**El-Afifi, 1985a and Allam *et al.*, 1995a**), banana bunchy top virus (BBTV) (**El-Afifi, 1985b**) and banana bract mosaic virus (BBMV).

So this study aims to eradicate the banana viruses via isolation of virus from naturally infected banana plants then propagated them on banana plants and produced virus-free banana plants by applying two programs: -

1. Establishment of an aseptic culture of banana *in vitro* and *in vivo* (tissue culture technique).

2. Continuation of banana plants growth and control the vectors and weeds in open field orchards.